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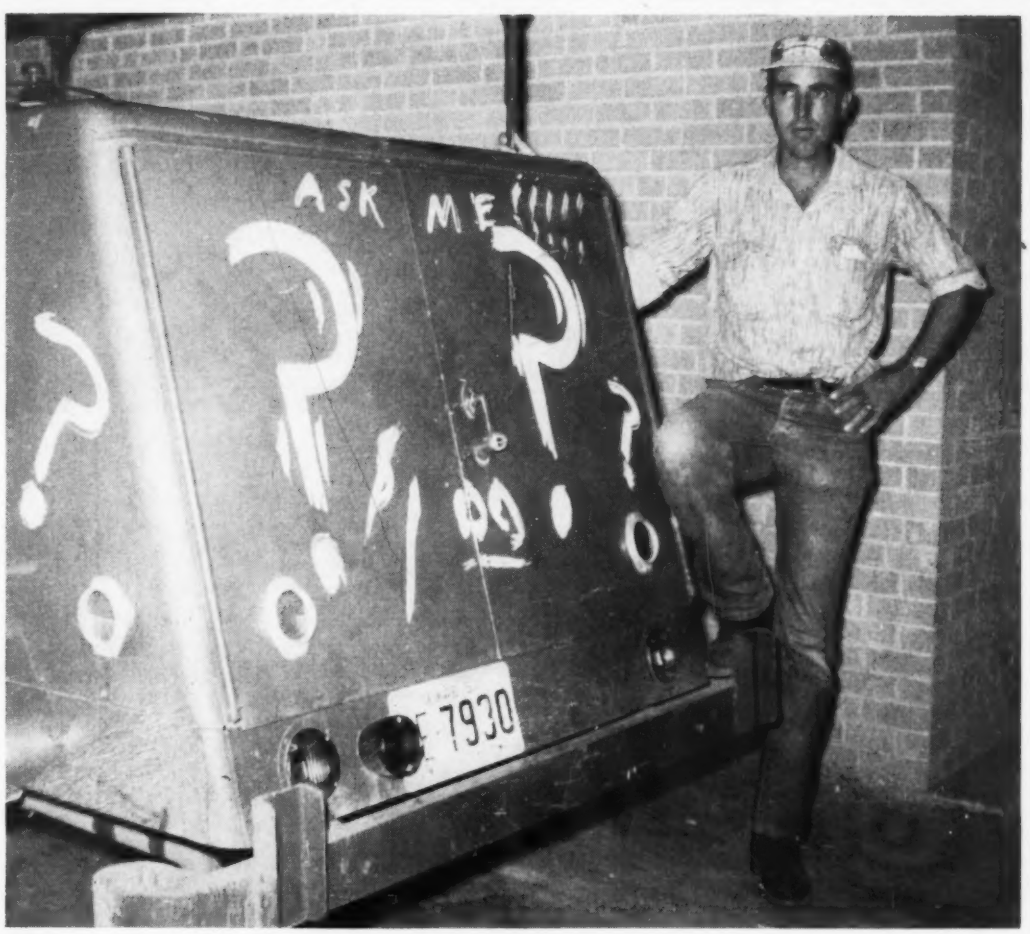
DECEMBER 14, 1957
VOL. 153—NO. 24

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY



Published every week on Saturday by TELEPHONY PUBLISHING CORP. 608 S. Dearborn St., Chicago 5, Ill. Subscription $4.00 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

VAC Guaranteed Circulation This Issue 12,403 of Which 11,702 Is Paid

$104,800 SALES DRIVE

General Telephone Co. of Southwest employes sell new services totaling $104,800 annual revenue in one-month sales campaign. Here Installer-Repairman Weldon Page stands by truck used to stimulate extension sales. See p. 34.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

XUM

PHILCO TLR-6 MICROWAVE

Provides Maximum System Reliability fo

PHILCO TLR-6 microwave provides economical transmission of NTSC compatible color or monochrome TV signals . . . plus full audio channel. Here is a completely modern microwave system . . . especially designed to meet the needs of community TV operators for thoroughly dependable operation.

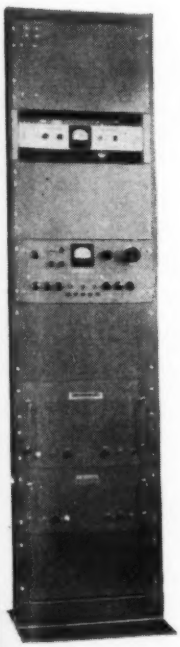
TLR-6 delivers 1 full watt output. Heavy duty power supply insures outstanding operational reliability in continuous unattended service.

Philco TLR-6 provides S-T-L relaying in the 5900 to 7400 mc bands. All components mount in standard 19″ racks. Unitized circuit construction simplifies maintenance. Built-in test and metering circuits in the new TLR-6 equipment assure uninterrupted service at all times.

Here is reliability of performance unaffected by severe weather, free from the many limitations of wire and pole lines, unhampered by problems of difficult terrain, over-water transmission or expensive rights-of-way.

Philco engineers will be happy to help you with your special Microwave requirements. Please contact us for further information. Write today for TLR-6 Specification Sheet.

for Unattended TV Relaying!



- Highly *reliable,* unattended one-watt operation
- Field proven in extended multi-hop applications
- *True* repeater permits top quality, long haul operation
- Highest power in the industry
- Full voice channel multiplexing
- Philco offers complete turnkey service . . . surveys . . . installation . . . maintenance

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FLASHES AND PLUGS

CALYPSO CUT-OVER. Public relations mediums are many and varied. The approach used recently in Southern Bell Telephone & Telegraph Co.'s Orlando, Fla., district to educate the public about a 2-5 cut-over qualifies as one of the more unusual. The company's employe magazine, *Southern Telephone News*, told about it as follows:

"Hey, lady, gonna change yo telephone number?

"That was the leading line in Orlando district's singing commercial used in their 2-5 cut-over. Put into the catchy calypso rhythm, this newest hit and rhythmic advertising was very favorably received by Orlando telephone subscribers.

"The recording, carried by six local radio stations and one television station was virtually the talk of the town.

"Hey Lady, gonna change yo telephone number
Man oh man, this town is humming,
2-5 number plan is coming,
Garden, Cherry, Crestwood, too
And Winter Park are offered you.
Hey Lady, what-at progress.
Now, the date you must remember
Is the 15th of September.
Dial two letters, then the numbers
And your calls will all get through
And your calls will all get through
Hey Lady, gonna change yo telephone number?"

"Jack Arnsdorf, building maintenance supervisor in Orlando, wrote the lyrics of this catchy tune and the music was by the Rollins College of Music. This proved to be a highly successful combination.

"A. W. Weber, Orlando district manager, credits Jack's song with much of the success of educating Orlando's subscribers about the cut-over."

•

SABOTAGE. W. L. Hudson, retired Illinois Bell Telephone Co. man, was credited with this bit of comic relief which appeared recently in the company's employe magazine:

First girl: "Where I work, we're not supposed to say 'phone.' We're supposed to say 'telephone.' "

Second girl: "Where do you work?"

First girl: "At the phone company."

•

SHE TROD LIGHTLY. Among the old gags which keep popping up, here is a shaggy mathematics story we came across:

The thoughtless person had asked the lady's age. "Well, let me figure it out for you," she said. "I was 18 when I married and my husband was 30. He is now 60, or twice as old as he was then, so I am now 36."

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

December 14, 1957

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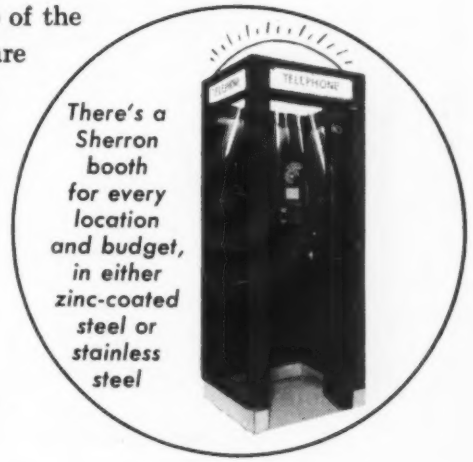
IN RECOGNITION OF THE U.S.I.T.A. KEYNOTE OF COOPERATION FOR THE ADVANCEMENT OF THE ENTIRE TELEPHONE INDUSTRY

a strong communications system needs the independent TELEPHONE COMPANIES

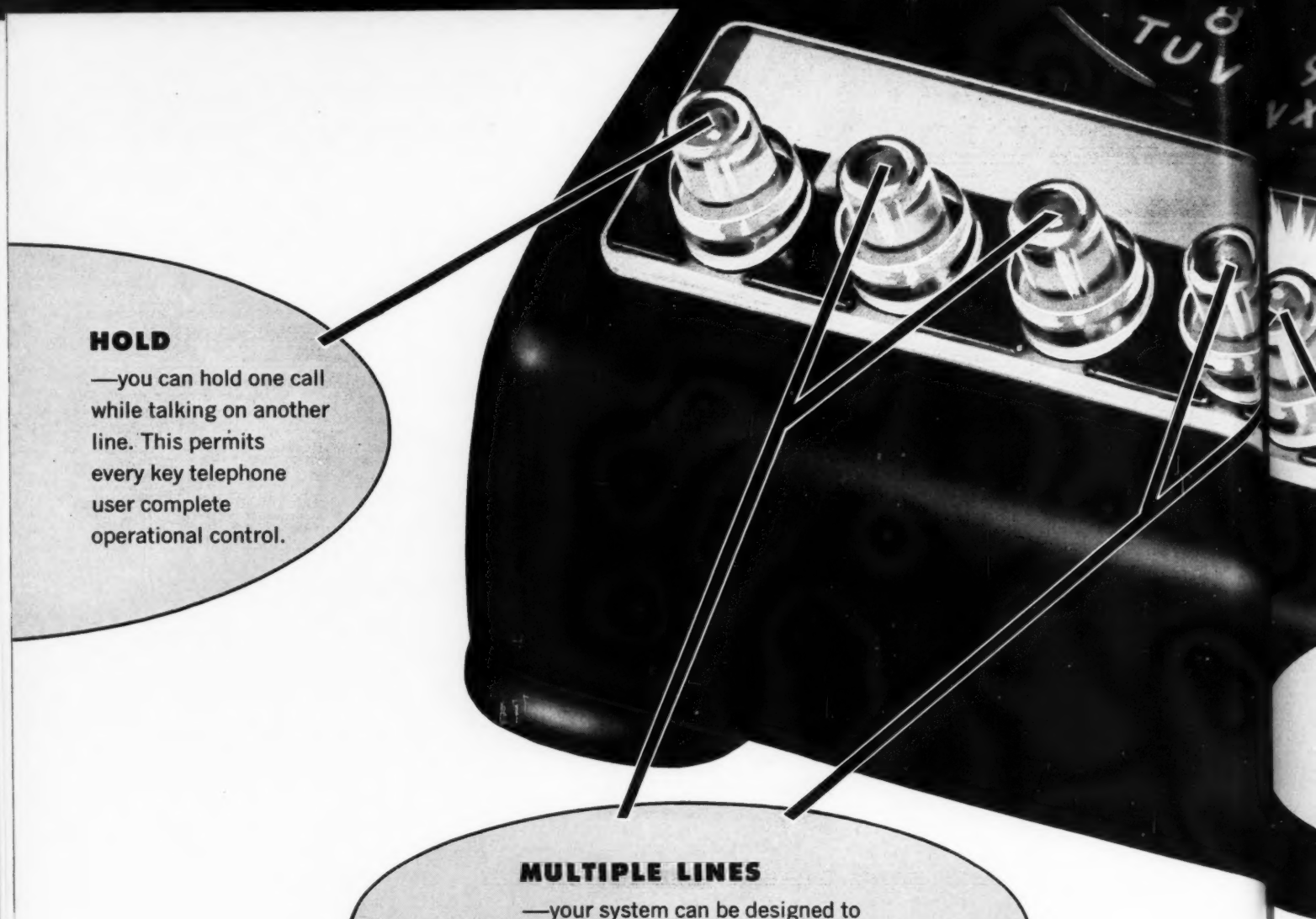
Giant ocean going vessels cannot come to port safely without the help of the tiny, maneuvering tugboat. You, the Independent telephone company are like this small but powerful tug – for by your cooperation with the big telephone companies you have extended the communications system of this country to make it the world's best. By your individual strength and cooperative action, you have promoted standards and practices that have been beneficial to subscribers everywhere.

You have played an indispensable part in affirming that this nation is one of free enterprise, free competition and free progress. The mutual bond, between you and ourselves, as a supplier, will be to the common good of our industry, your subscribers and all America. Your continued strength is the nation's strength.



SEE OUR CATALOG IN SWEET'S INDEPENDENT

SHERRON METALLIC CORP., 1201 FLUSHING AVE., BROOKLYN 37, N.Y.



HOLD
—you can hold one call while talking on another line. This permits every key telephone user complete operational control.

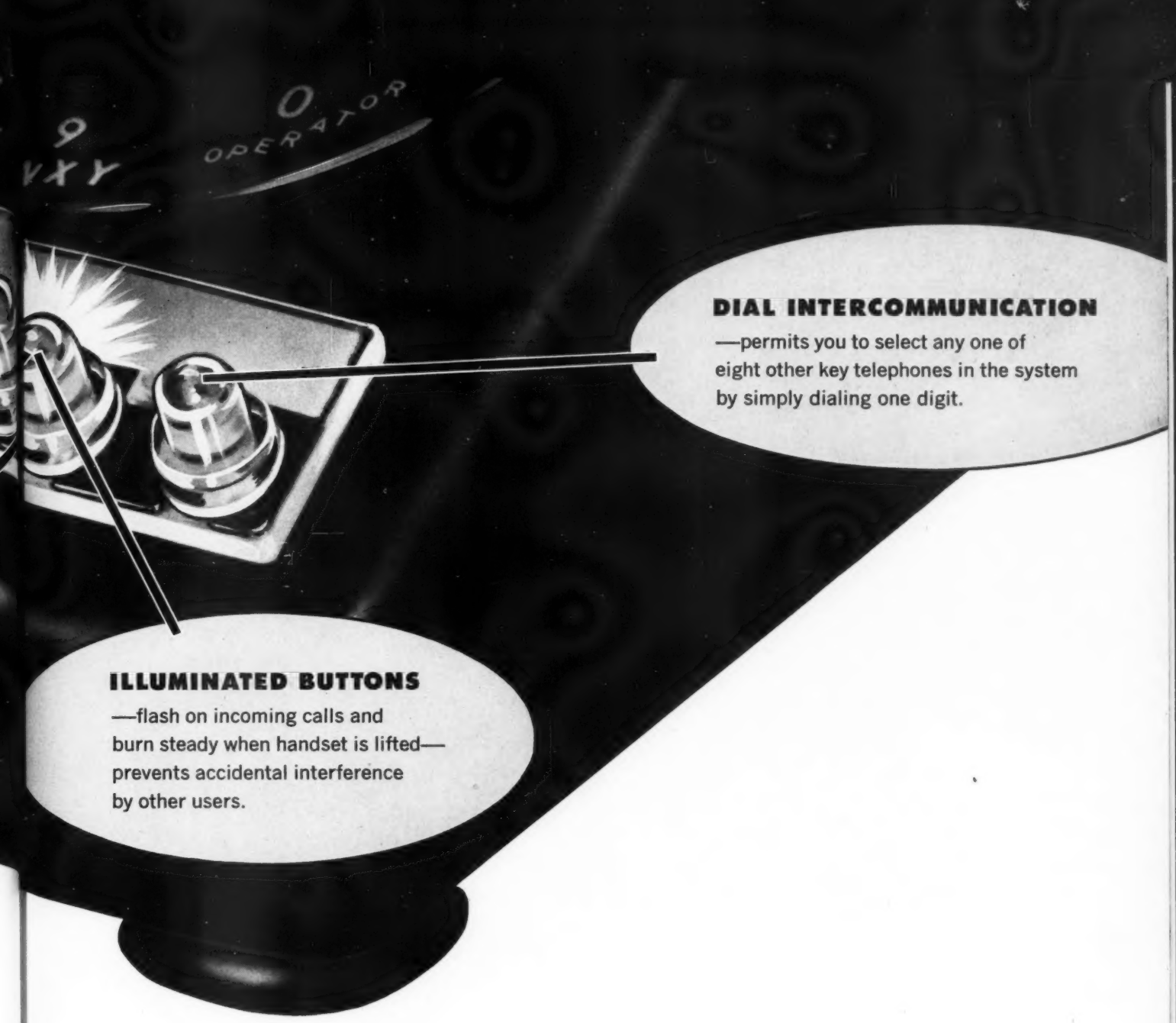
MULTIPLE LINES
—your system can be designed to select as many as four central office or PBX lines, thus affording maximum use at all times.

IT'S THE BIG

It's BIG saleswise. *1A1 Type key systems are selling faster than any other type in the nation. Subscribers in independent areas want the best, too, and they get it with the K1A1.*

It's BIG featurewise. *Kellogg's K1A1 has all the important features which have made 1A1 systems so popular, including dial intercommunication, and illuminated buttons.*

But it's SMALL in size and cost. *The K1A1 key systems is engineered to be easy to install. It occupies a minimum of wall space. And it's rugged equipment . . . maintenance calls are reduced to a minimum.*



DIAL INTERCOMMUNICATION
—permits you to select any one of eight other key telephones in the system by simply dialing one digit.

ILLUMINATED BUTTONS
—flash on incoming calls and burn steady when handset is lifted—prevents accidental interference by other users.

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A DIVISION OF I T & T

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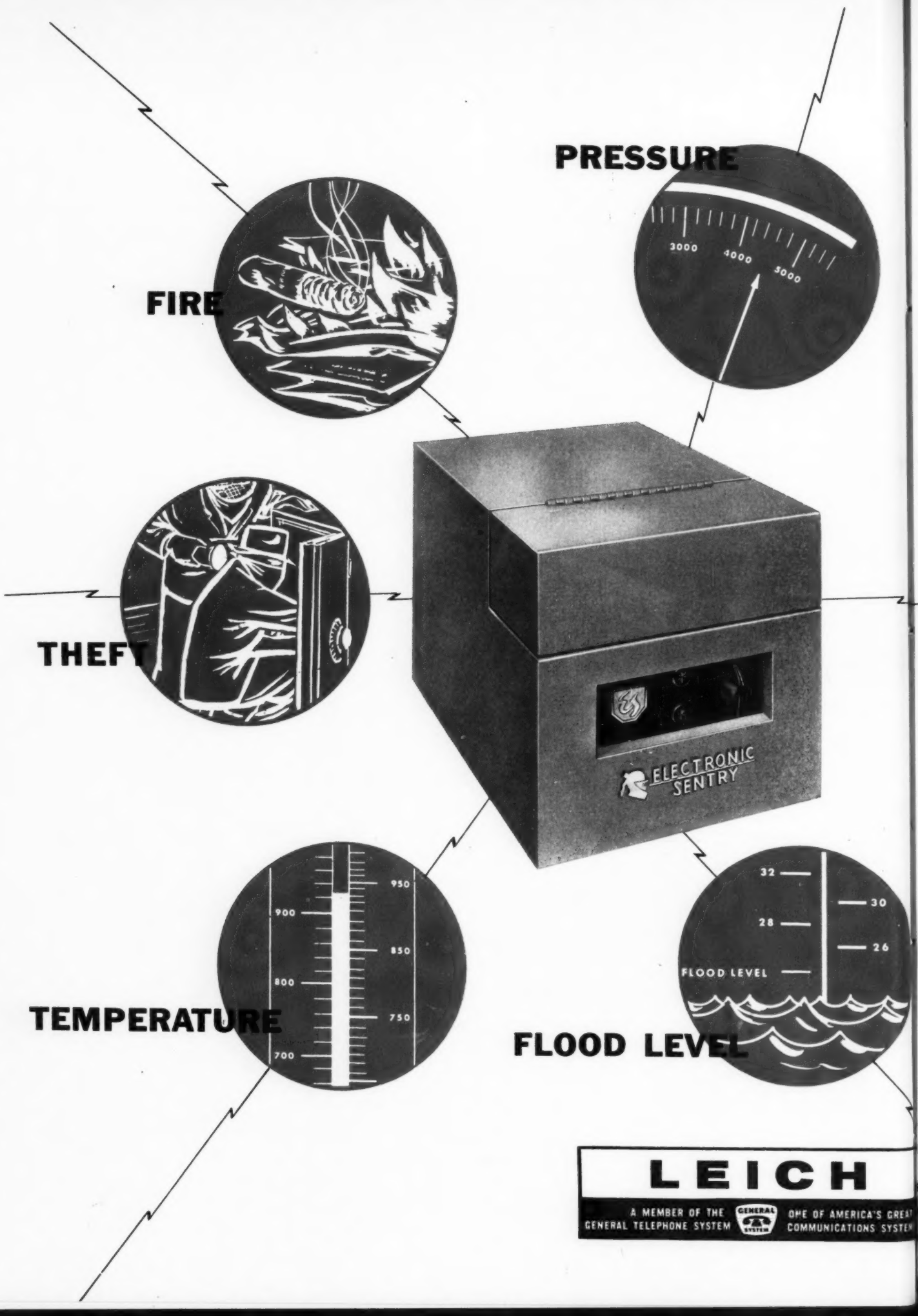
XUM



LEICH

A MEMBER OF THE GENERAL TELEPHONE SYSTEM — ONE OF AMERICA'S GREAT COMMUNICATIONS SYSTEMS

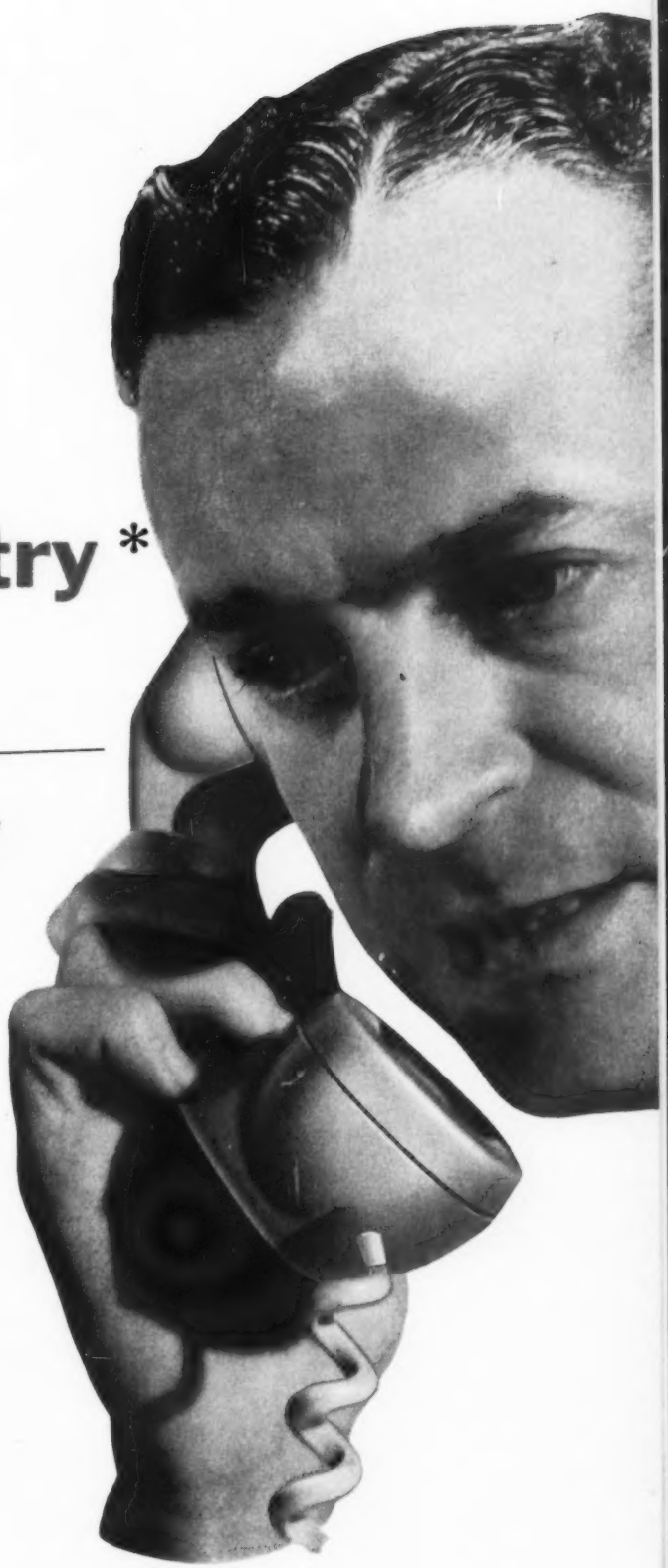
What it does

Once activated, this is what the Electronic Sentry will do, and do it electronically and silently:

1. It will detect the trouble and then connect itself to the telephone line.
2. Dial a pre-determined number electronically so that the authorized person can be reached.
3. Inform the authorized person when he answers the telephone of the nature of the trouble existing. The warning message is transmitted repeatedly so that if it were not correctly understood the first time, constant repetition would insure comprehension on the part of the listener.
4. At the end of a pre-determined time, the unit would disconnect momentarily from the telephone line. However, if the condition that caused the warning device to operate were not corrected, it would again dial the number until the warning message is acted upon.

The Electronic Sentry* warns you

quickly . . . repeatedly . . . accurately



What it is

The Electronic Sentry is an automatic 24 hour a day watchman. It's capable of detecting a wide variety of dangerous conditions and alerting a designated individual telephone. Sturdily built and compact, the unit consists of the primary detection device, a specially designed record player, an electronic relay amplifier and an audio amplifier. The detecting device could be a thermostat, a burglar detector, a water level gauge, or any control capable of closing a switching circuit. Any one of these will cause the Electronic Sentry to go into action.

Your subscribers will find that they can use this safety device to excellent advantage in a number of places such as hatcheries, boiler rooms, schools, warehouses, stores and businesses of all kinds.

For more information on this new source of additional revenue for your company, write to Leich now!

*Electronic Sentry a product of Electronic Secretary Industries, Inc., Waukesha, Wisc.

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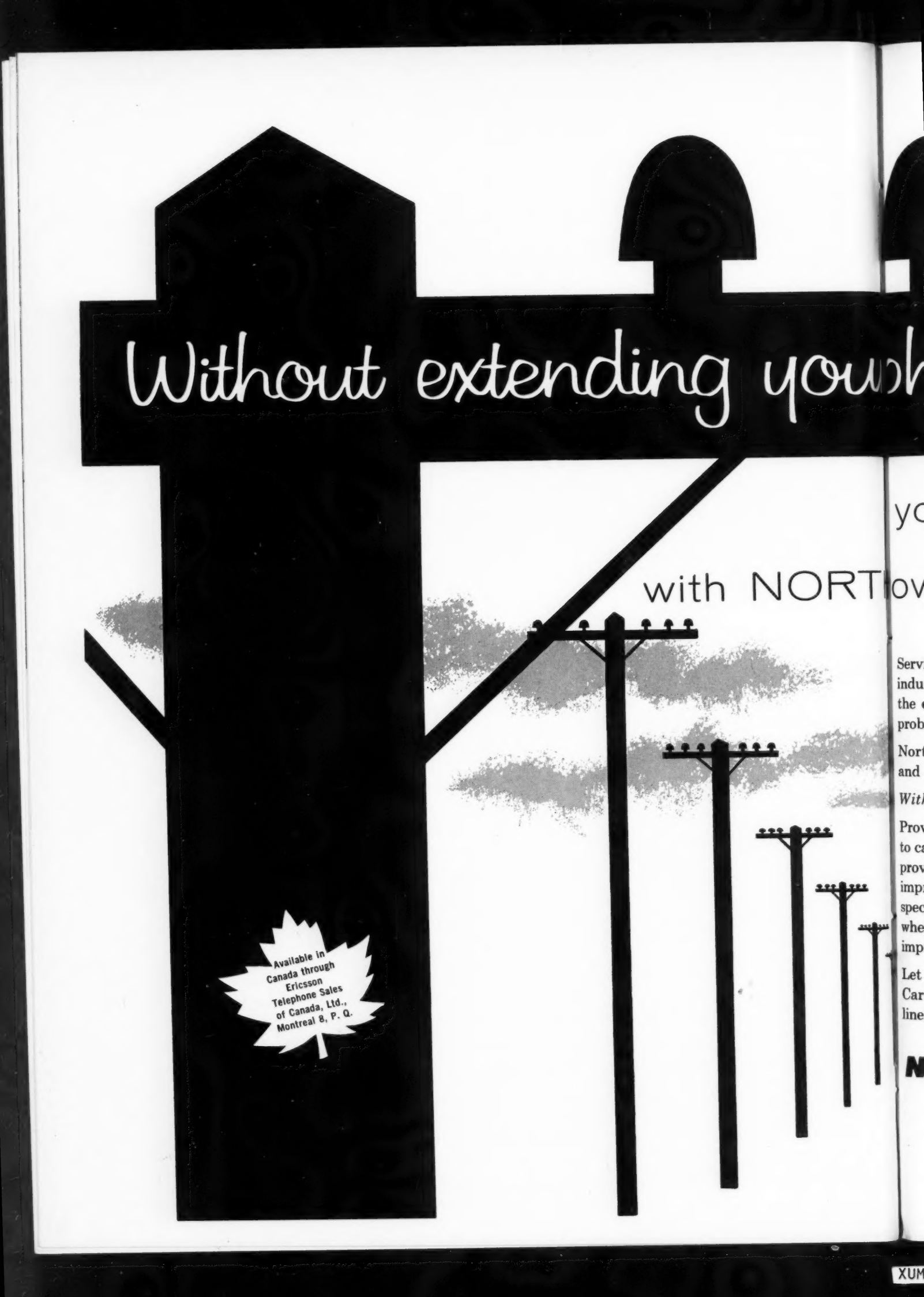
anufacturers of telephones, switchboards and related apparatus since 1907


Without extending yours
with NORT
Available in Canada through Ericsson Telephone Sales of Canada, Ltd., Montreal 8, P. Q.

...physical lines...

you can extend your service

...low cost SUBSCRIBER CARRIER

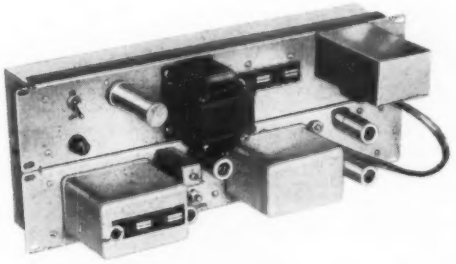
Service to the community has always been the keynote of the telephone industry. Yet today many Independent Companies, anxious to meet the ever increasing pressures for extended service, are faced with the problem of heavy expense incident to the construction of physical lines.

North Low Cost Subscriber Carrier has been specifically engineered and built to overcome this obstacle.

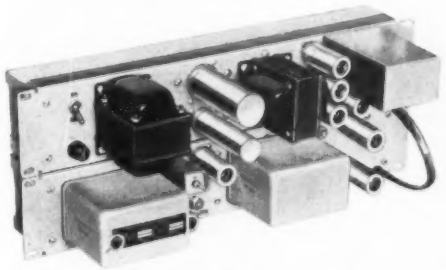
With North Subscriber Carrier you can:

Provide service for waiting list customers adjacent to lines now filled to capacity; reach potential customers beyond the end of present lines; provide private, two-party, or four-party lines not now available, with improved rate earnings; free physical circuits for pay stations and other special revenue services; meet demands for special temporary service, where carrier can be moved to meet changing requirements; and offer improved service to customers now on overcrowded lines!

Let your NORTH representative show you how NORTH Subscriber Carrier can do all this for you at a substantial saving over physical line construction.



CENTRAL OFFICE TERMINAL

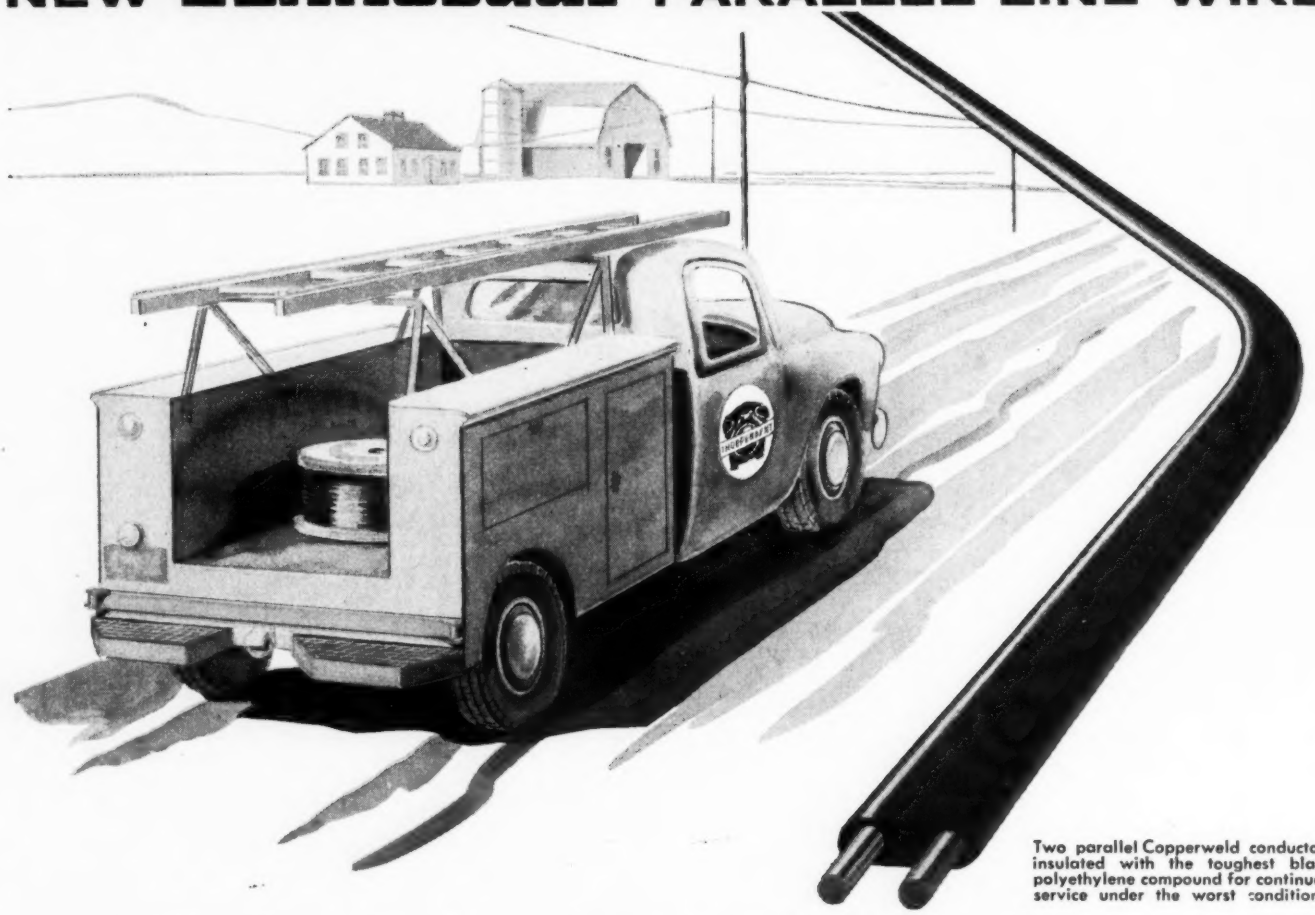


DISTANT TERMINAL

NORTH ELECTRIC COMPANY

601 SOUTH MARKET STREET • GALION, OHIO

NEW ANSONIA® Ankoseal® PARALLEL LINE WIRE



Two parallel Copperweld conductors insulated with the toughest black polyethylene compound for continued service under the worst conditions.

Answering The Call For Quality!

Ansonia's enviable reputation for quality is emphasized once again in this new product. You simply will not find parallel line wire that gives better transmission qualities and takes a beating in the open the way Ankoseal Parallel Line Wire does!

Install your span lengths to absolute maximum with a feeling of complete security even to heavy loading zones. Transposing ANKOSEAL Line Wire is simplicity itself . . . simply twist the desired number of turns between poles. Highest quality transmission characteristics can be obtained and cross talk eliminated in rural areas.

Ansonia Ankoseal Two Conductor Parallel Line Wire is available in #12 or #14 AWG in 5,000 or 15,000 foot reels.

Insist on ANSONIA Ankoseal *quality*

ANSONIA® **Ankoseal®**

Aerial and Direct Burial Cables

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B.U.G. Cables

Rural Distribution Wire

THE ANSONIA WIRE & CABLE COMPANY · ASHTON · R. I.

The Oldest Name In Plastic Telephone Cables In The Most Modern Plant Devoted Entirely To Producing Plastic Cables

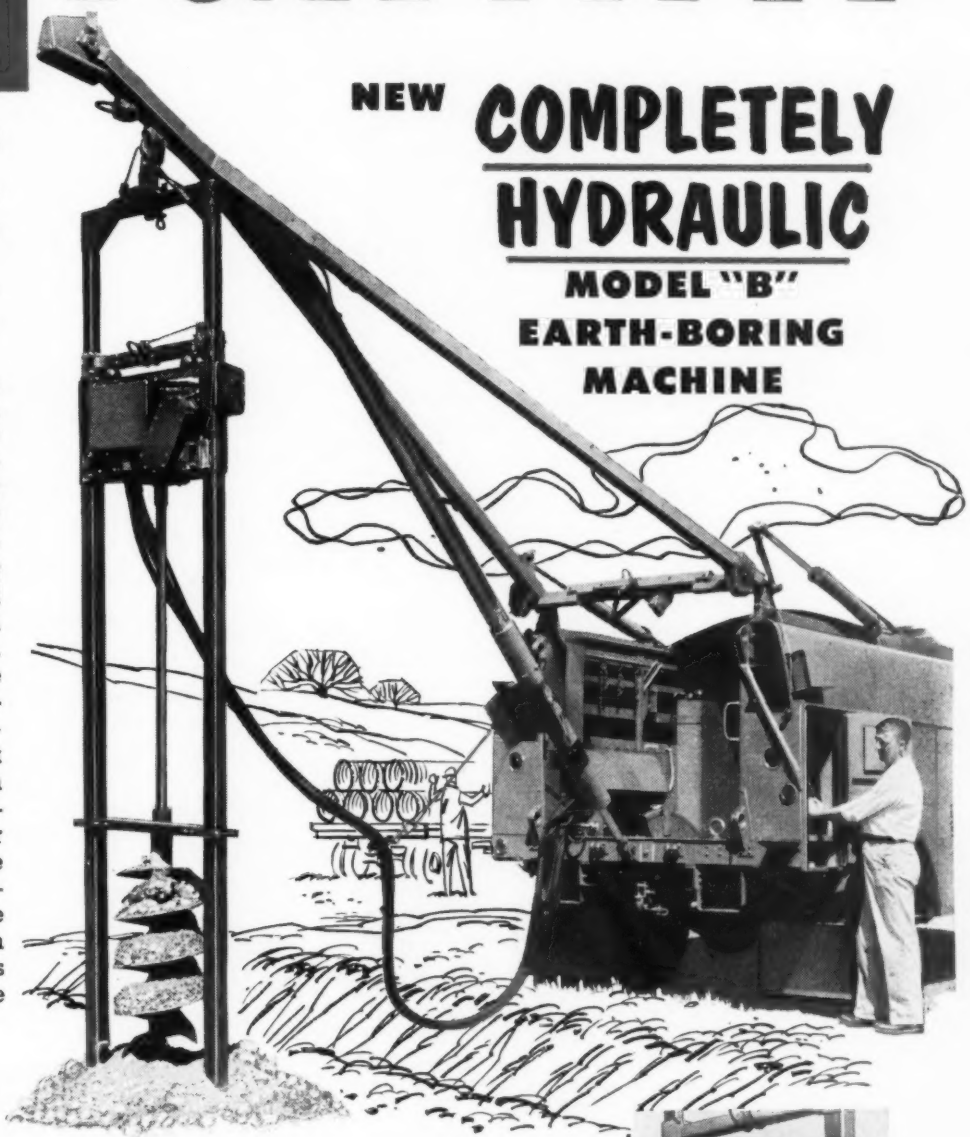
HIGHWAY

Digs holes 11 to 22 inches in diameter, up to 7 feet at any angle up to 90°... *all hydraulically*

Here is your answer for easy, safe, convenient digging. A pressure feed hydraulic digger with "fingertip" remote hydraulic controls — that digs rapidly in every type of soil including frost and hard pan. The swivel-mounted digger pivots to dig anchor holes and is operated from the rear of the truck in a convenient standing position. This rugged, suspended-type digger has a "reaching" capacity for hard-to-get-at areas — fits on roof of truck, does not take valuable truck room. With the Model "B" digger in position, the derrick is free for any pole-setting operation. The Model "B" digger can be rear- or front-mounted on any type line maintenance body, with any type hydraulic derrick. This unit is time-tested to insure trouble-free operation.

NEW COMPLETELY HYDRAULIC

MODEL "B" EARTH-BORING MACHINE



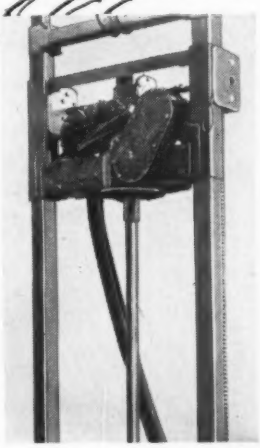
HIGHWAY

A Division of Merritt-Chapman & Scott Corp.

Exclusive! **CHAIN CROWD ASSEMBLY AND "HOLE SIZER"**

Actuated Chain Crowd Assembly assures rapid and smooth downward digging action. The flight auger featuring the "hole sizer" blade cuts a trim hole to diameter desired.

Write for information and specifications



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Manufacturers of: Public Utility Bodies • Earth-Boring Machines • Pole and Cable Reel Trailers • Winches • Power Take-offs • Service Accessories • Commercial Trailers • Trailerized Tanks and Dry Bulk Haulers

SALES AND SERVICE IN PRINCIPAL CITIES

XUM

BICC execute Major Telecommunication Projects ANYWHERE IN THE WORLD

Consult BICC about the Planning Manufacture and Installation of Telecommunication Projects.

We have had long experience in this kind of work in many parts of the World. A few of our recent contracts are briefly described below.

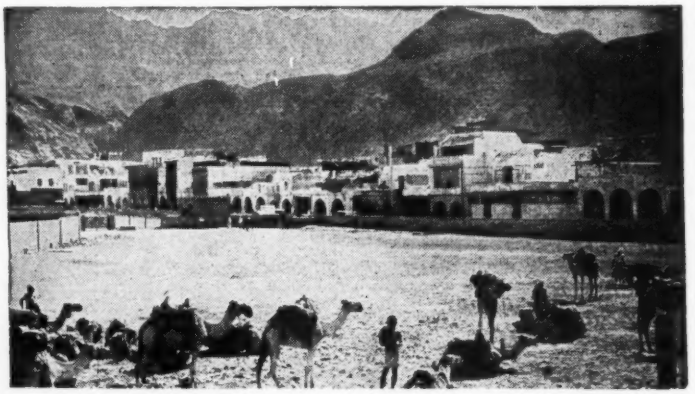
The following types of BICC Cable are in continuous manufacture for telephone administrations in many countries: coaxial and balanced pair cables for carrier working, long-distance audio cables, paper or polythene insulated exchange-area distribution cables.

We shall be pleased to give you further information from our nearest Branch Office or from our Headquarters in London.

AUSTRALIA *Electrification of the New South Wales Railway Western Line has necessitated a completely new track-side cable scheme covering the 34 miles from Sydney to Penrith. The main cable comprises 6 pairs for 24 channel carrier working and 60 audio pairs for local telephone and control purposes. Many of the audio pairs are terminated at railway stations, signal huts, power substations, etc., in order to provide local facilities. The installation was undertaken by BIC Construction Co. for the N.S.W. Railways Department, the cable being manufactured by BICC.*

NEW ZEALAND *BICC have supplied a long-distance cable between Auckland and Hamilton for the New Zealand Post and Telegraph Department. BIC Construction Co. supervised the installation and undertook the progress and transmission testing. The cable consists of 4 coaxial tubes to provide long-distance carrier or television circuits, together with a surrounding layer of 54 audio pairs for intermediate local circuits. The pairs are loaded. The cable is buried direct in the ground for most of its eighty-mile route, except when passing through towns where it is laid in ducts.*

VENEZUELA *BIC Construction Co. have undertaken the jointing and supervision of installation of a 448 pair 20 lb. long-distance audio cable to improve the telephone service between Caracas and Maiquetia. With a route length of approximately seventeen miles, the cable runs wholly in ducts along the side of a newly-constructed auto-road linking the capital town of Caracas with the coast. This contract has been undertaken for the Compania Anonima Nacional Telefonos de Venezuela, the cable being manufactured by BICC.*

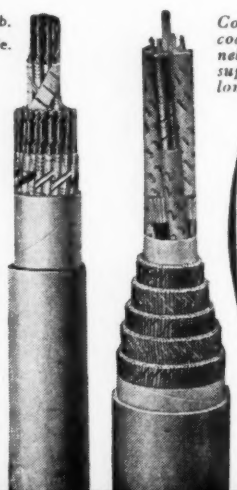


ADEN *To extend existing facilities and to cater for the Colony's growth, a new distribution network has been installed comprising approximately 44 miles of BICC cables specially protected against soil corrosion.*
The new network provides an increase of 3,000 lines and consists of paper-insulated local distribution cables ranging from 15 to 200 pairs, the larger sizes being of the unit twin type. A short balanced and loaded audio cable was also installed to link the Town with the new refinery site at Little Aden. This contract was undertaken for the Aden Posts and Telegraph Department.

Left: a BICC jointer at work on a coaxial cable, cutting the tubes ready for jointing. Two typical cables for carrier working are illustrated on right.

BICC manufacture every type of telecommunication cable and undertake their installation — anywhere.

24 channel 24 pair 40 lb. carrier telephone cable.



Composite cable with 4 coaxial tubes for 960-channel or television, with 18 supervisory pairs and 390 long-distance audio pairs.

BICC

***Planning • Manufacture • Installation for* TELECOMMUNICATION SYSTEMS**

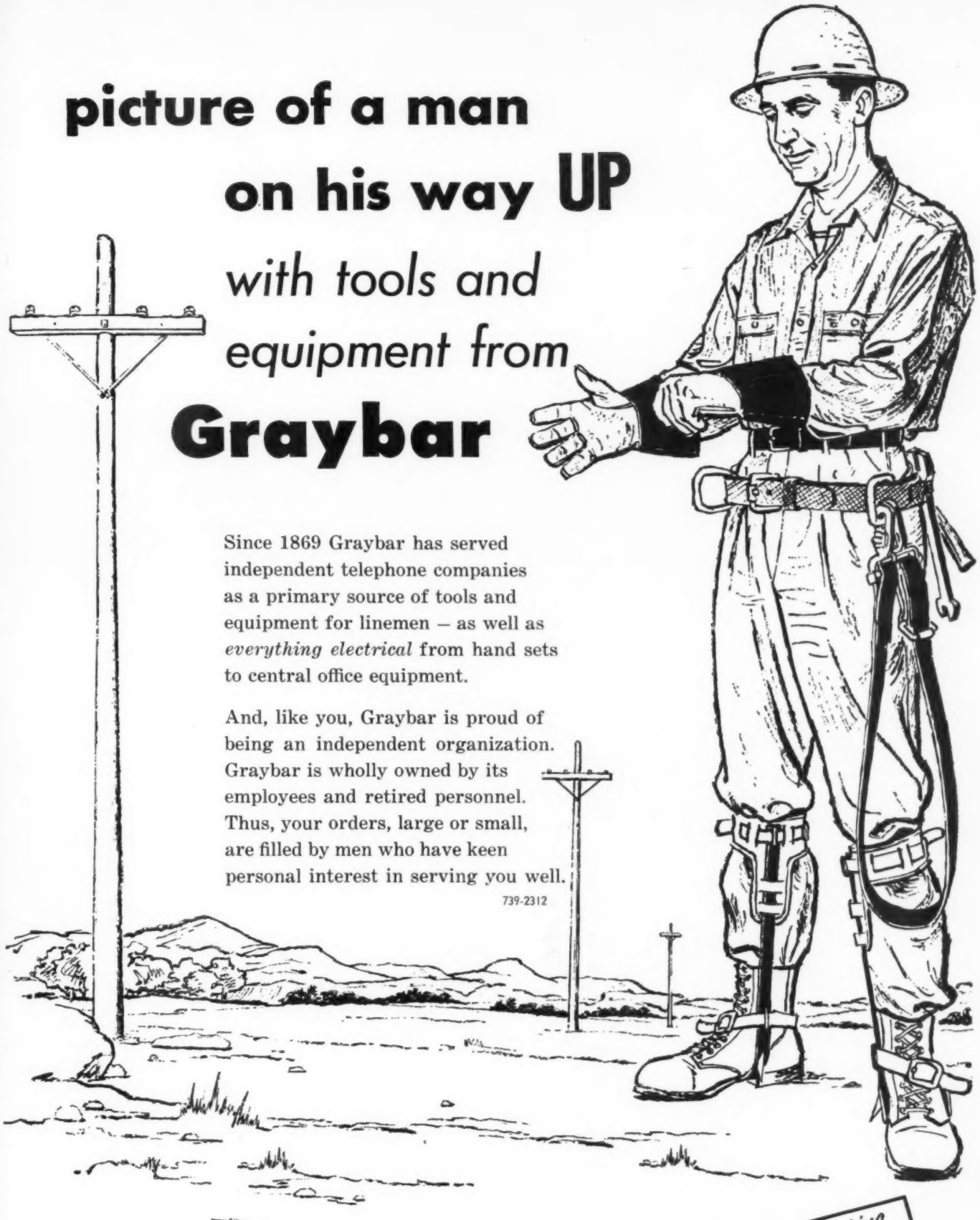
BRITISH INSULATED CALLENDER'S CABLES LIMITED
21, Bloomsbury Street, London, W.C.1, England

Branches and Agents throughout the World

picture of a man on his way UP

with tools and equipment from

Graybar



Since 1869 Graybar has served independent telephone companies as a primary source of tools and equipment for linemen – as well as *everything electrical* from hand sets to central office equipment.

And, like you, Graybar is proud of being an independent organization. Graybar is wholly owned by its employees and retired personnel. Thus, your orders, large or small, are filled by men who have keen personal interest in serving you well.

739-2312

Call Graybar first for...

GRAYBAR 1 QUALITY *Everything in Telephone Supplies*

GRAYBAR ELECTRIC COMPANY, INC.
420 Lexington Avenue, New York 17, N. Y.

IN OVER 130 PRINCIPAL CITIES

XUM

mad ?

Snorting like a bull because rising costs are catching up to profit margins? Our Complete Directory Service Plan will have you mooing contentedly.

Today, we do a complete directory job for independent telephone companies in 4400 communities . . . save them time and worry while revenues go up.

We can do the same with yours. For information, call or write our nearest office.

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GENERAL TELEPHONE DIRECTORY COMPANY

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Federal-state committee recommends 40 per cent of excise tax on local telephone service be passed on to states. CWA approves AT&T employe stock purchase plan. REA has loaned over 400 million dollars to telephone companies and co-ops. Management and labor discuss automation.

THE PRESSURE against any tax cuts which was generated by the step-up of the missile program has not made the picture any brighter for repeal or curtailment of the telephone excise tax. Now, comes something else. A federal-state committee recommended on Dec. 5 that the federal government kick back to the states 40 per cent of its tax on local telephone calls, so states can take over certain functions from Uncle Sam.

The probability that such a report would be made has previously been noted in this department. The federal tax on local telephone calls (10 per cent) now brings in about 370 million dollars a year. Under the committee proposal, states would get 148 million dollars of this.

Those states desiring to take part in the plan would enact a 4 per cent tax on the telephone service, which would be in addition to any tax they now levy on the service. The federal government then would give taxpayers a credit for this 4 per cent paid to the states. It then would charge telephone companies only 6 per cent instead of the present 10 per cent as a federal tax. At the end of five years, the tax credit arrangement would end and the federal tax would formally be reduced to 6 per cent. States then would decide whether to keep their own 4 per cent, change it, or eliminate it.

The tax proposal was the chief point of an initial report submitted to President Eisenhower and Governor Stratton of Illinois, chairman of the Governors' Conference, by a federal-state action committee headed by Secretary of the Treasury Anderson and Governor Dwinell of New Hampshire.

The committee grew out of a proposal by President Eisenhower to the Governors' Conference last June. He suggested a study looking to the transfer to the states of certain functions now performed wholely, or in part, by the federal government. Briefly, the committee made these other recommendations:

Vocational Education. Repeal of federal legislation authorizing vocational training in agriculture, home economics, trades and industry, distributive occupations, and the fishery trades and industries.

Natural Disaster Relief. Urged that states and local governments are required to spend minimum amounts during a year for repair of facilities damaged by natural disasters, before becoming eligible for federal aid.

Atomic Energy. Amendment of the Atomic Energy Act to give states added responsibility in promoting and regulating peaceful uses of atomic energy in such fields as public health, safety, and inspection, and in the enforcement of standards not in conflict with federal standards.

CWA OK's Insurance and Stock

Good news for the Bell System came from a source recently which has not been notably enthusiastic about American Telephone & Telegraph Co. management ideas (particularly as they affect employes). The reference is to the Communications Workers of America (CWA), the executive board of which recently met in Atlantic City. The board approved, "in principle," the practice of stock purchases by workers in the industries where they are employed.

The CWA executive board's action was based on a proposal of the AT&T to issue convertible debentures, amounting to 7 million shares to be offered to Bell System employes for purchase over a period of time. According to a Bell System advertisement in the New York *Times*, this offer of bonds which can be converted into stock by the purchasing employes is part of the gigantic 720 million dollar issue of convertible debentures which AT&T stockholders will be asked to approve next month.

If approved, it will be the largest stock offering in the history of corporate finance. But labor unions and labor leaders in the past have been somewhat uncertain about union employes acquiring securities in the business which employs them. There are different schools of thought on this subject.

There has been the feeling in some quarters that acquisition of the securities of their employers might have a tendency to make union employes more "management minded" or more sympathetic with management's point of view. On the other hand, forward-looking labor leaders have considered that both management and the other stockholders would be benefited by some infiltration of employe stockholders.

From a disinterested point of view, it might also be observed that ownership of stock in an employer company should tend to make an employe take more of an interest in his job, his company, and its affairs. There is nothing like owning a piece of a company, even such a small piece as a single share of stock, to spark an incentive for the stockholder to get a better understanding of

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the company's business, how it works, its problems, etc.

Evidently the executive board of CWA has been inclined "in principle" to the more liberal view that union workers might profitably invest (in more ways than one) in the industries where they are employed. Note that this statement of principle by the CWA board is not confined to telephone companies. It mentions "industries," presumably any employer industry which issues sound securities.

So the board has directed the president of CWA, Joseph A. Beirne, to study the AT&T stock issues. Beirne has been told to analyze whatever action is taken by the AT&T stockholders at its mid-January meeting and to take whatever further action he thinks is necessary to put into practice the executive board's approval in principle of stock purchases by employes.

In its discussion of the entire question of employe stock purchase plans, CWA's policy makers agreed that organized labor could serve as a further stabilizing force in the great American economy through individual workers' ownership of shares in that part of the industry where he or she serves.

One other area of agreement between Bell System management and the CWA —aside from various wage negotiations —deals with the AT&T group insurance plan. This has been hanging fire for some time since it was proposed by the AT&T for Bell System employes.

At first the CWA did not seem to take very kindly to the idea and its publications lambasted it unmercifully for awhile as a management scheme which would not yield to the employes all the benefits possible or proposed.

Apparently there've been some second thoughts, minor changes, negotiations, and finally a meeting of the minds. And, so, CWA and Southwestern Bell Telephone Co. have signed up what may be a model group insurance plan for agreements between other Bell System companies and the CWA.

The group life insurance plans had already been put into effect by various Bell companies for all eligible employes, regardless whether they were members of the CWA or not. But, such a proposal is subject to collective bargaining as far as CWA members are concerned. And, that calls for acceptance by the union.

The agreement with Southwestern Bell (subsequently adopted by the CWA in agreement with the four Chesapeake & Potomac Telephone companies and Southern Bell) is an optional agreement. Eligible employes may elect to enroll for insurance coverage at the rate of 50 cents a month per thousand dollars of life insurance in excess of the first thousand dollars. The first thousand dollars will be paid for by the company. The allowable coverage will be equal to employes' annual base pay up to the nearest annual bracket. Southwestern has already paid for the December coverage, and the plan will go into effect after the first of the year if at least 75 per cent of the eligible employe group represented by the CWA enrolls.

REA Makes Telephone Loans of $520,000

The Rural Electrification Administration approved rural telephone loans during the week of Nov. 25 amounting to $520,000 to one new and one existing borrower. The funds will make possible initial service for 261 rural subscribers and improved service for 736 present subscribers in Idaho and Iowa.

Project Mutual Telephone Cooperative Association, Inc., Rupert, Idaho; $149,000 (Nov. 29)

The funds will finance construction of 82 miles of line to provide initial telephone service for 206 new rural subscribers. They are homestead units of the North Side Pumping District's irrigation program (Bureau of Reclamation) located in unincorporated communities. Service will be provided through an extension of the borrower's exchange at Paul, Idaho.

Upon completion of construction scheduled under this and previous loans, the borrower's system will provide automatic dial service for 3,436 rural subscribers, with automatic central offices at Paul, Norland and Rupert. The cooperative's commercial offices are in Rupert.

William J. Henscheid Jr. is president and Donald Dickens is manager of the Project mutual.

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Rockwell (Iowa) Cooperative Telephone Association; $371,000, first loan (Nov. 29).

The borrower plans to use these funds to improve service for its 736 existing subscribers and to serve 55 farm families now with no telephones in its area. At present the cooperative provides magneto service. Central offices are located at Daugherty and Rockwell.

In the proposed expansion, magneto switchboards will be replaced with new automatic equipment at both exchanges. Present plans include continued service without toll between the two areas. The business office for the system will remain at Rockwell.

Dr. Reece W. Phillips is president of the Rockwell cooperative.

Round-up on REA Loans

The Rural Electrification Administration's (REA) rural telephone loan program had reached over 400 million dollars as of the end of October. A summary of loans approved indicated that approximately 412 million dollars in rural telephone loans on a cumulative basis are outstanding as of that date. Of this amount, 253 million dollars had been advanced and a balance of 159 million dollars is still pending disbursement. REA is authorized to lend 60 million dollars for new projects during the fiscal year 1958.

As of Oct. 31, REA had on its books a total of 568 borrowers, of which 363 were commercial telephone companies and 205 were telephone cooperatives. It is interesting that the number of telephone cooperative borrowers shows very little increase. Since the beginning of the fiscal year 1958, REA has only put on the books one new telephone cooperative borrower as compared with 16 new telephone company borrowers. During the preceding fiscal year there were only 8 new cooperative borrowers as compared with 77 new telephone company borrowers.

Effect of Automation

Last week in Richmond, Va., the Instrument Society of America sponsored a symposium discussion on the effects of automation on the American economy. Since one of the speakers happened to be a telephone industry official, and your correspondent happened to be in the neighborhood of Richmond's John Marshall Hotel, he dropped around to catch what turned out to be a rather interesting session.

There were spokesmen for labor and management, and a psychologist who

was, presumably, neutral. The labor and management speakers drew quite opposite conclusions about the effects of automation, whereas the psychologist took a rather hedging position to the effect that it is too soon to tell and let's wait and see. John P. Frazee, general sales and service manager of the Chesapeake & Potomac Telephone Co., and Ted F. Silvey of the AFL-CIO headquarters in Washington, D. C., agreed on one result. That is that automation will eventually mean an over-all increase in employment.

Frazee saw problems here and there, but predicted an upgrading of job opportunities. He said that to supply the needs of an expanding population it will be virtually impossible to reduce the workweek despite automation. Silvey saw the need for full employment at high pay and with a guaranteed annual wage. He remarked that automation will produce increased collective bargaining problems, with emphasis on what to do about transferring employes, training them for new jobs, and how to take care of older workers replaced by machines.

However, to Dr. R. H. Henneman, professor of psychology at the University of Virginia, there is need for more time and study before judging economic and social effects of automation. He stated: "Predictions of management about the effect of automation on society tend to be rosy while labor is apt to be cautious. The scientist has not studied the situation long enough to reach conclusions."

Dr. Henneman raised a few questions of his own: Will automation tend to concentrate wealth and power in the hands of a few? What about the need for and proper use of leisure time? Will the accelerated pace of automation outstrip the processes of social adjustment? He didn't answer any of these questions.

Frazee said all progress has been resisted and automation is simply progress. He went on to say that automation releases employes from routine jobs to do jobs that require creative ability. It means more salesmen, managers, and creators, he continued, and it reduces fatigue. "Jobs in the industrial world requiring brawn will decline," he said, "while those requiring brains will increase."

He ruled out a shorter workweek because of a growing population and an anticipated jump in gross national product (value of all goods and services produced). By 1975, the nation's population will increase 40 per cent, but the labor force will grow only 20 per cent, Frazee stated. Automation, he said, means simply that "each worker can produce more without working longer." In other words, if automation is to be used only to work less in order to produce the same, then there is no net economic advantage gained.

Young people are spending more time in study nowadays, Frazee commented, and, therefore, enter the labor force later in life. If a four-day workweek became the practice, he said, there would be 21 million unfilled jobs by 1975.

Silvey said automation might mean more jobs over all, but it will mean fewer jobs in "wealth-producing" fields —manufacturing, mining, transportation, and communications. The result, he continued, will be more jobs in "non-productive" areas such as education, health, insurance, recreation, and sales.

He questioned whether there will be a market for all the products of automation. He predicted vigorous bargaining sessions to avoid undue hardship on individuals due to dislocation of their particular jobs by automation. He wants to be sure that "people won't have to pay the full price of progress because their finger was in the crack when the door slams on it."

E. S. Bigelow, an economist for the Minneapolis Honeywell Regulator Co., said the record of past technological advances is encouraging. "In the long run," he said, "machines create more jobs than they destroy."

Canada's Subsidized TV in Trouble?

It may be of interest to folks in the allied communications field of the telephone business, to know that the storm signals are flying over the Canadian Broadcasting Corp. This is the wholly-owned government corporation which operates the Dominion's broadcasting system under a heavy subsidy from the government for which the taxpayers must pay. But CBC—as it is called throughout the Dominion—has been unlucky enough to fall out of favor with the government in power on the last political go-around.

Long a favorite of the preceding Liberal Government, which set it up and nourished it with appropriations for many years, CBC now finds itself not only at odds with the Conservative house of commons, but with some disgruntled Liberals as well. The Conservatives have long had it in for CBC, charging it with Labor Party bias and with being a haven for Liberal Party jobholders. Some of the Liberals as well have seen in CBC, with its increasing financial difficulties and fall in public popularity, a political liability. About the only true friend of CBC in the house of commons at Ottawa is the leftish Commonwealth Federalist Party. And that could be a kiss of death as far as conservative Quebec and Ontario are concerned.

The Conservatives, in their 1956 political convention, when making the present Prime Minister John Diefenbaker their leader, even drafted and adopted a resolution to strip CBC of its power over all radio and television in Canada. A Conservative MP, John Taylor of Vancouver-Burrard, has called for the outright dissolution of CBC. He had cabinet ministerial authority for his attack. "Broadcasting," he said, "like newspaper publishing, should be able to subsist well and usefully under a system of private enterprise with no drain on the public treasury."

Few commercial sponsors have been willing to pick up the full CBC tab for their programs, so the network—living off a government subsidy itself—has been making up the difference. None of the CBC services justified the operation of three national radio networks, the television system with their staff of 6,000 and taxpayer-financed 40 million dollar budget, Taylor argued.

Already on the financial spot, the CBC, politically vulnerable under the never friendly Conservative regime, has done little to help itself. Conservatives in the commons have been astonished to see CBC still following what they believe to be the Liberal line, with all the old partisans loading its roster of people on call for its public service programs. Hence the growing Conservative cry for the CBC to be given some discipline.

The interesting lesson which might be indicated here is that, in a fairly evenly divided party set-up, a public ownership agency which flirts too much with one side has to expect some hard times if and when the other side comes to power. No public ownership agency has yet seemed to get the knack of running with the hares while chasing with the hounds, in the eventual turnabout of partisan politics.

Commentary on the Market

"It's unwise to pay too much, but it's worse to pay too little. When you pay too much, you lose a little money—that is all. When you pay too little, you sometimes lose everything, because the thing you bought was incapable of doing the job it was bought to do. The common law of business balance prohibits paying a little and getting a lot—it can't be done. If you deal with the lowest bidder, it is well to add something for the risk you run. And if you do that, you will have enough to pay for something better."—JOHN RUSKIN.

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Data Transmission

By HAROLD B. McKAY, Electronics Editor

Part 4
Facsimile

MUCH of the original experience obtained by telephone companies in the art of data transmission came from the use of telephotograph equipment. In its original form this system transmitted photographs from one telephone office to another in different parts of the country. Later improvements in equipment made it possible for press services and others to own their own telephotograph equipment, and send the transmission over telephone company wires.

The art of telephotography, or facsimile transmission as it is more often called, has undergone many improvements since the old days when the equipment had to be operated in a darkened room. Present-day equipment embodies many improvements over the old photographic film and chemical methods.

Among the systems developed are mechanical reproducers which will reproduce a picture at the receiving end by means of an electric current which is passed through special paper. This paper produces an image which is ready for instant use and which requires no photographic processing in chemicals.

As a result of these developments facsimile is now a practical tool for business men instead of a special service for newspapers. This can place a further demand upon telephone companies to provide a class of facility which will be usable for this type of transmission.

An instrument which is symbolic of the trend in this direction is the Stewart-Warner Datafax. This is an instrument about the size of a teletypewriter, which will accept photographs, line drawings, typed or printed copy of any page length and transmit them over telephone, radio or micro-wave circuits to a distant point where they will be reproduced on a similar machine. This means that the original copy of business records can be kept at the filing point and faithful duplicate copies delivered to any part of the world in the matter of a few minutes at a paper cost of less than two cents per page.

The Datafax will give a definition of 96 lines per inch in 10 shades of grey from white to black. It will transmit 180 lines per minute by using a carrier frequency of 2,400 cycles, which will be transmitted over the telephone line.

In operation, the original copy as it enters the machine is illuminated by two fluorescent lamps; a lens focuses an image of the copy through a spiral aperture in a revolving scanning disk; a photoelectric tube converts this light to electricity which is used to modulate a local oscillator.

The receiver contains a helix and a printer blade between which the paper is drawn. The received image is electroplated on this special paper. An automatic synchronizing signal is sent between the transmitter and receiver before picture transmission commences.

The ability of this equipment to rapidly transmit copies of photographs, price changes, design changes, and customer's specifications will find a wide application in business. This will mean additional revenue for telephone companies which are prepared to handle this type of transmission.

The Stewart-Warner Datafax transmitter. This machine will send pictures, drawings, letters, or anything that can be photographed, over telephone, radio or microwave circuits.

Now back to data transmission and circuits.

Telephone companies are at a certain disadvantage when it comes to testing some data circuits. Unlike plain teletype circuits, where a monitor machine can be put on the line to check results, a telephone company is not likely to have an IBM or SAGE unit laying around for testing purposes.

Yet data circuits are much more sensitive to impulse noise and phase delay than are teletype or telegraph circuits. Instruments like the Western Union 450A measuring set mentioned earlier have been devised to measure delay conditions on lines, but these are not in general use by telephone companies.

Cathode ray oscilloscopes can be used to detect impulse noise on a circuit, because these instruments will show noise impulses that will not register on the meter of a noise measuring set. These impulses, or noise peaks, show as sharp spikes flashing at random above the background noise pattern.

These transients are enough to cause false pulses in a data transmission system, even though they would not interfere with voice transmission.

The matter of phase delay or envelope delay is of great importance in some data circuits. Phase delay is a condition which results in some frequencies being retarded more than others as they travel over the line.

Actually, because of the reactance present on the circuit some phase delay may be expected. Because of the fact that a coil on a line, by its "retarding" effect, causes the current flow to be "choked" or slowed down, it gets over the line a little later than the voltage, which is not slowed down.

Phase

A condenser on the line, or even the capacitance of the wires, causes the

voltage to be held back and the current flows ahead. In either case, the current is out of phase with the voltage. "Out of phase" can be understood as out of time or out of step. Normally, any kind of a circuit has both of these conditions, because just an ordinary piece of wire has both capacitance and inductance.

Ordinarily, a change of phase over a line would not be of significance to most data circuits, if it occurred at all frequencies in the same amount.

Take for example the Collins Kineplex mentioned in an earlier chapter. This sends 20 different frequencies at once, and it sends them in short bursts or pulses. The receiving mechanism has an electronic gate which opens for a few thousandths of a second. During that short time, all frequencies should be received, but if the telephone pair delays some frequencies more than others, some would not be received by the time the gate closes.

Actually, systems of this sort have a certain amount of leeway built into them, so that they will work with practical telephone circuits, but the line must be good. Trouble of this nature was experienced many years ago when the first telephotograph circuits were put into use.

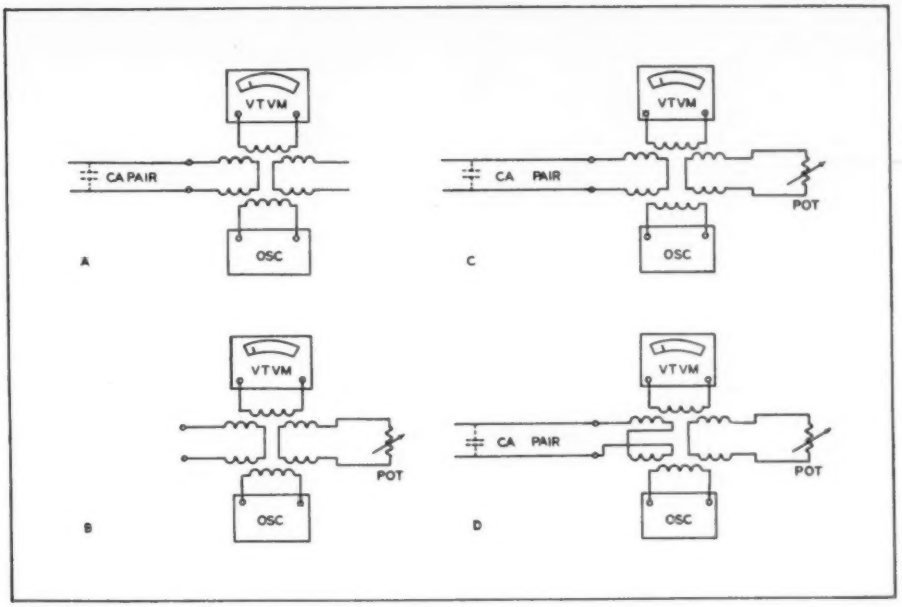
In fact, it was in July 1930, when Nyquist and Brand of AT&T defined envelope delay as "the first derivative of phase shift with respect to frequency," and discussed different methods for measuring the condition. (See Bell System Monograph B-483, or the *Bell System Technical Journal* for July 1930.)

Until testing equipment becomes generally available to telephone companies, they are going to have to do the next best thing, that is to test the plant precisely by available methods.

DC Tests

For instance, when a new data circuit is connected it should be given every dc test possible; resistance of one wire of the pair should be compared to the other, and to other circuits on the same lead in order to detect high resistance splices or other conditions. "Megger" or similar tests should be made for the insulation condition and corrective steps taken.

DC measurements and 1,000 cycle ac or other transmission tests should be compared with engineered values. That is, the results obtained by actual measurement should be compared with standard wire and cable tables or recorded plant information to make sure that a circuit measures to the value it is expected to have. Any significant discrepancies should be investigated.



The impedance of a cable pair or wire line may be measured by means of a vacuum tube voltmeter, an oscillator and transformers connected as shown. At A a meter reading is a measure of the power conducted through the circuit by the pair. B shows the way a potentiometer is set to give the same reading as A. The reading of the resistance is then the same as the impedance of the pair. At C a reading is taken with both pair and matched potentiometer resistance in the circuit. At D one branch of the circuit is reversed, which if pair is pure resistance will cancel out the other branch and no reading will result. Any meter reading which occurs is a result of phase shift on the pair and is a measure of return loss. (Drawing by Victor Willard.)

Impedance

A good clue to the data handling ability of a pair can be obtained by making impedance measurements on the circuit. A facility which has different impedances at different frequencies can cause a phase shift at some frequencies and hence cause trouble on some kinds of data systems.

A number of methods exist for making tests of this sort. One method which is popular with those who do not own expensive impedance bridges is that of resistance substitution. With this method, the magnitude of the impedance on the line is measured with an oscillator and a vacuum tube voltmeter.

A variable resistance is then connected to the oscillator and meter and the resistance is adjusted until the same reading is observed. The resistance (which is calibrated) is then the same as the measured impedance.

How this is done is illustrated in *Fig. 4.1*, which is derived from a system patented (No. 1,684,403) by W. P. Mason. See also *Bell Laboratories Record* for January, 1956—"E-Repeater Test Set."

At A is shown an arrangement whereby an oscillator puts out ac, which is coupled through a transformer, a cable pair and another transformer, to a vacuum tube voltmeter. A reading will be obtained which is dependent upon how much current is conveyed by the cable pair between the two transformers.

The pair may be terminated as it would be in actual use, but even if it is open at the far end, the cable capacity will pass enough current to give a reading on the meter.

The actual reading obtained should be noted, then, by means of switches; the hook-up should be changed to that of B. Here the pair has been disconnected, and a potentiometer or calibrated resistance is placed in the circuit. This resistance is adjusted until the same reading is obtained on the meter as was obtained when the pair was hooked up.

When the reading is the same, the resistance of the potentiometer and the impedance of the pair will have the same numerical value.

The next step is to switch to the hook-up shown at C. The pair is the same and the resistance is left at the same setting as was obtained in B.

In this condition, the current will flow equally through the left hand transformer windings plus the pair and the right hand windings plus the resistance. This will result in an increase of the reading on the meter.

If the new reading is off scale, either the oscillator or the meter multiplier should be adjusted to bring it back on scale. The actual reading is unimportant as long as it is on scale.

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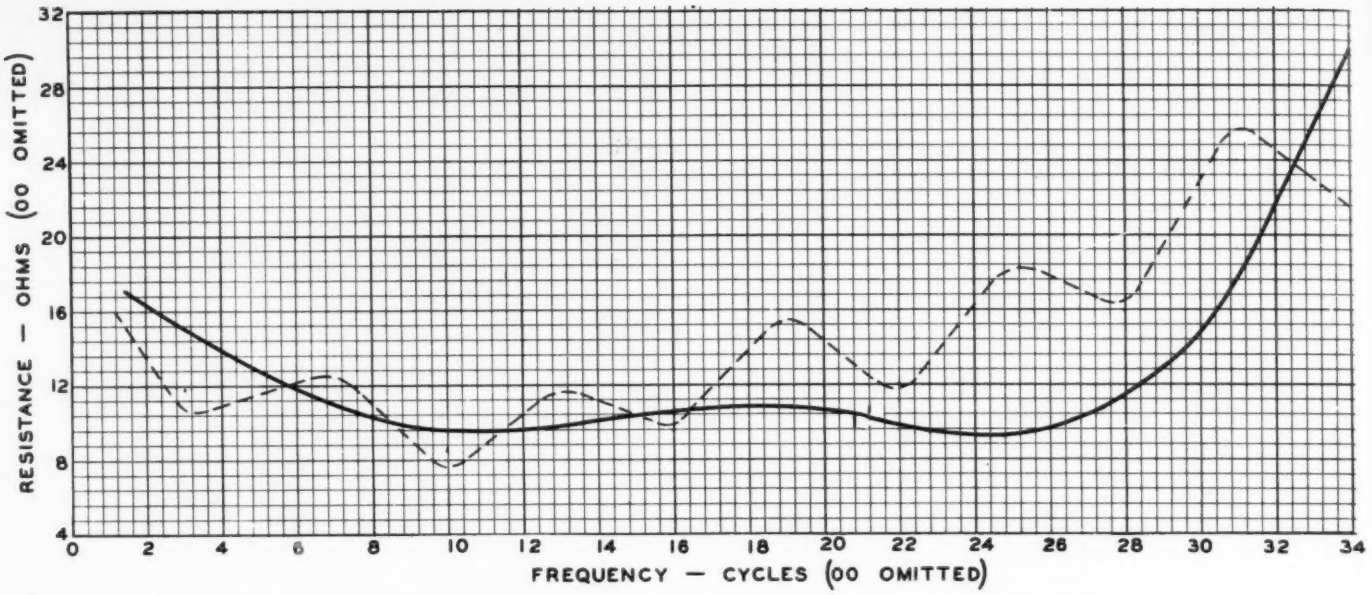

Fig. 4.2. The solid line shows the impedance curve of a normal-loaded cable pair. The dotted line shows the impedance variation which can result from mis-located load coils, bridged taps, or mismatching.

Cancellation

In drawing D, one of the transformer windings is reversed. Now, this would be expected to cancel the reading on the meter completely, because the current going into the transformer connected to the meter is in the opposite direction on each side.

With the potentiometer and the cable pair equal in resistance, it would be expected that the current in each winding would be equal and opposite, which would cancel out, and leave no power to get through to the meter.

Actually, if the cable pair was pure resistance this would happen. However, any resistance in the cable pair will mean that the current flowing will be either advanced or retarded compared to the current through the resistor. It will, therefore, be out of phase or out of time with the current in the resistor. Even though the two currents may be equal, they will not cancel out completely because they are not there at the same time.

Accordingly, a reduced reading will be obtained in D compared to the setting left on the meter at C. The amount of this reduction is a measure of the reactance on the line, or of the phase shift. Read in decibels on the meter it becomes return loss, and return loss can be converted into phase angle.

Whether the reactive condition on the line is positive or negative can be determined by temporarily switching a small condenser across the resistance, then across the cable pair. If the meter reading rises as it is switched to the pair, it shows that the reactance is negative (90° to 180°) in nature. If the reading falls, it will indicate a positive phase angle (0° to 90°) on the pair.

It will be seen from the drawings that the hook-up resembles the hybrid coil connection in a repeater. Test sets using this principle may use hybrid coils for the transformers.

In actual use, tests would be made of a cable pair at several frequencies throughout the voice range. The pair would ordinarily be terminated in the equipment that is expected to work with it.

This equipment should match the characteristic impedance of the cable pair or wire line, because a mismatched termination can result in an apparent reactive condition being reflected back along the line.

Mismatched Pairs

A mismatch can also result when pairs or wires of different sizes are connected together. Cases like this, particularly in carrier work, may call for impedance matching transformers at the junction of the unlike facilities.

When a pair is tested at several frequencies by the means described above, a curve may be plotted which may look something like that shown in *Fig. 4.2.* This shows as a solid line a reasonably "smooth" loaded cable pair. It has fairly even impedance in the middle voice range, then increases as the cut-off point is approached.

The dotted line is a curve of a pair which has impedance mismatch trouble on it. The zig-zag up and down effect shows that the impedance varies rapidly as the frequency is changed.

Pairs of this sort usually change from inductive to capacitive and back again at different frequencies. Circuits like this usually exhibit a varied phase delay condition and are unsuitable for data transmission.

This condition can be caused by loading coils which have been installed in the wrong location, that is, where the coil does not cancel out the cable capacity exactly.

Another cause can be a loading coil of the wrong value, or one which is connected up wrong. Bridging taps on either cable or wire lines also can cause a pattern like this, as can mismatching or wrong termination of the circuit.

The humps in the curve are due to the effect that radio men call standing waves. As the power bounces back up the line from the point where the misplaced load coil, bridged tap or other discontinuity exists, it meets the oncoming wave from the oscillator or other current source.

At certain frequencies, depending on the distance to the defect and the speed at which the current travels on the wire, the reflected and incident waves will add together, and at other points they will subtract.

Because of this, the distance to the fault can be determined with reasonable accuracy by studying the curve as prepared in *Fig. 4.2.*

Velocity

First of all, one must know the velocity of propagation—the speed at which electricity travels on the particular cable being used. This figure can be obtained from the manufacturer or from tables like those appearing in IT&T's "Reference Data for Radio Engineers" (fourth edition). The wire line section of this book contains many

(Please turn to page 47)

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

UNTIL quite recently anyone would be severely criticized for abbreviating a telephone number. For example: NAtional 6-8900 would never be written simply NA6-8900. The advertisements we have noted in all of the Yellow Page directories have always had all of these prefixes spelled out in full. In the alphabetical listings, however, NAtional might be abbreviated Nat'l.

Then advertisements in the daily papers and magazines started reducing the prefixes to the first two letters followed by five digits and now it is not uncommon to see telephone numbers so indicated on signs, trucks, etc.

Now we note by *The Michigan Bell* magazine that in Detroit the alphabetical directory is being reprinted to show two-letter central office abbreviations instead of the full central office names. By so doing, with a number such as WOodley 3-9900 (it will become simply WO 3-9900), and by making each page 5/8 inch wider, it will be possible to set five columns on each page instead of four.

It is also stated that this action will reduce the overall size of the directory about 20 per cent.

We are firm in our conviction that the next move—and it will probably be made in the not-too-distant future—will be to eliminate the bothersome letters from our telephone numbers entirely and give us simple and easily understood seven-digit numbers. Then WOodley 3-9900 will become simply 963-9900.

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It is claimed that the American factory worker today is safer at his occupation than he is during his off-time hours.

We were informed by the safety men in a large telephone company recently that they had taught their workers to observe safe practices on the job, but that the majority of their accidents happened during off hours in the home.

He blamed the majority of these accidents to the increased trend to "do-it-yourself" practices where unskilled or semi-skilled men attempt to perform tasks for which they are not properly equipped or trained.

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The writer enjoyed a trip recently into the Deep South. We took an Eastern Airlines Super G Constellation from Washington to Atlanta, Ga. Here, we visited the Signal Corps communicators at Ft. McPherson and renewed acquaintance with the Southern Bell Telephone & Telegraph Co. officials and engineers.

The South is rapidly becoming industrialized and the telephone companies are doing a fine job in keeping abreast of the rapidly-increasing communication requirements.

In Atlanta, we had the pleasure of attending a meeting of the Armed Forces Communications & Electronic Association and heard a most interesting lecture on the Navy's Vanguard project by Fred J. Friel Jr., manager of field operations in tracking and guidance for the Naval Research Laboratory, Washington, D. C.

Here, we also took advantage of an opportunity to visit Stone Mountain and view the Confederate Memorial started by Gutzon Borglum back in 1922, but which has never been finished.

Today, the figure of Lee stands out majestically against the face of the mountain. He is complete to the waist, his horse is roughed in; Jefferson Davis is readily recognized, and Stonewall Jackson and his horse's head and neck are roughed in.

Engineers estimate that this group can be completed in 18 months. The estimated time required to complete the entire project is 14 years of steady work at a cost of 5 million dollars. Completion of the memorial is to be a joint effort of the state of Georgia and the city of Atlanta.

We also had an opportunity to view the Cyclorama of the Battle of Atlanta, housed in an imposing structure in Grant Park. (This park is named for Colonel L. P. Grant who had donated most of the land to the city for a park, and not U. S. Grant as we had originally thought.) This mammoth canvas was painted by a group of German artists at Milwaukee, Wis., in 1885-1886. It is truly beautiful and we enthusiastically recommend that you see it when you are in Atlanta.

We left Atlanta for Huntsville, Ala., in an Eastern Martin 404 and after a good lunch and a one-hour flight we sat down in the Rocket City. We wish that we could tell you more about this place, but will only mention that it is presently booming. There, also, the food is excellent. We enjoyed our breakfast next morning of eggs, grits, hot biscuits, ham and red eye gravy.

We left Huntsville in another Eastern Martin and when we sat down at Nashville it was snowing hard. We had never expected such weather in the South during November. The weather was better in Louisville and there we changed to an Eastern Constellation and after a good steak dinner, and a flight of one hour and 50 minutes, we sat down at National Airport in Washington, D. C.

•

We are well aware of the fact that the fumes from carbon tetrachloride can prove deadly if they are breathed in any quantity. A case recently came to our attention in which a man died within days after having made use of this fluid to clean the kitchen linoleum.

Due to this ever-present danger, safety-conscious telephone companies have practically all discontinued the use of carbon tetrachloride for cleaning purposes. The question is then raised as to what may be used to replace it for telephone cleaning purposes and we believe that we have at last found the answer.

About two years ago a product was

XUM

developed that was known as Magnolia Chlorothene (1,1,1-trichloroethane, inhibited). We understand that it has no toxicity and one could take a bath in it with no ill effects. Yet, it has all of the cleaning properties of tetrachloride. Furthermore, it is not a fire hazard, has extra-high solvency and rapid drying time.

Chlorothene is an excellent solvent for cleaning metals contaminated with grease, oils, tars and waxes. It is also especially suitable for cold-cleaning, dip-cleaning and does not corrode aluminum or aluminum alloys under ordinary conditions. Chlorothene has no flash point and no fire point.

•

We note that a gang of coin-stealing thieves, captured in San Francisco recently, employed a different and novel method of robbing pay telephones installed in outdoor-type booths. This gang attached a logging chain to the coin box and attempted to pull it out with a car. If the box did not let go, they would drag the booth to a secluded spot where the wrecking of the coin box permitted them to steal the coins it contained.

The above would appear to indicate that outdoor type booths should in all cases be installed on a firm foundation, and be well illuminated at night.

•

It is claimed that since the end of World War II, the emphasis has shifted from the college education to the college degree. For an increasing number of jobs, the bachelor's, or master's, or doctor's degree is simply a sort of glorified union card. With it you qualify for the job; without it, you simply haven't a chance.

•

Many people in this country were extremely excited when Russia beat this country to the launching of an earth satellite. They even expressed fears that we had been left far behind in the supposed race for survival. In this writer's opinion, the *Detroiter* put it well when it said:

"We'll start getting jealous of the Russians when they learn to clothe, house, feed, and transport their people better than we do ours. Most great inventions that have created immense industries and vast employment in America, originated abroad. But did you get upset when Marconi invented the wireless, when Nobel developed dynamite, when Faraday boxed up some electricity, or when Diesel perfected his engine?"

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. Can you please inform us what the present-day thinking is on the painted or treated poles?

A. The American Wood Preservers Institute has the following to say on this subject. Many of the treatments, whether creosote, pentachlorophenol solution, or water-borne salts, present very agreeable after-effects and do not need paint.

Where painting is desired for purposes of visibility, salt-treated wood can be painted after it has dried as readily as untreated wood.

Poles treated with creosote or oil-borne preservative, if allowed sufficient time for surface drying after treatment, can be painted satisfactorily with aluminum paint powder in an approved vehicle. Paint of another color can be applied over the primary aluminum coat.

If painting is to be considered, the matter should be taken up with the treating plant when the order is placed so that the poles may be properly seasoned, treated, and dried.

In most cities, utility and municipal officials believe it unnecessary to paint for decorative purposes; painting is restricted to those locations where a high degree of visibility is desirable.

•

Q. We'd like to know whether it will be necessary to provide lightning protection for carrier systems?

A. One authority states that there is a dual purpose for lightning protection of carrier systems as follows:

(1) To provide, as far as practicable, electrical shock hazards to the subscribers and to the personnel engaged in installation, maintenance and operation of the system.

(2) To minimize electrical damage, the amount of such reduction to be based upon the importance of the service, the availability of replacements and the over-all economics of the problem.

•

Q. What type equipment may be used so that an injured child may be able to hear his class at school and participate in the recitations until such time as he recovers and may again attend his classes?

A. Special school-to-home telephone systems have been designed and may now be procured for this purpose.

We suggest that you contact your telephone supply house as this set will prove entirely satisfactory and it is more economical than an improvised system.

•

Q. Will it be possible to purchase an outdoor pole-mounted cabinet for the installation of communication equipment? Can you tell us some of the features of such a cabinet, if it is available for this purpose?

A. One manufacturer of electronic equipment has an insulated outdoor equipment cabinet that provides rack mounting facilities with a total of 38 mounting plate spaces.

The basic cabinet is equipped with a thermostatically controlled louver for ventilation. A weather shield and folding work shelf are provided in the basic cabinet and are accessible from the front when the door is open.

Threaded holes are provided at both the top and bottom of the cabinet for installation of a cable terminal stub. A gasketed cover plate is furnished for the unused hole.

Cabinet mounting brackets are supplied, but mounting hardware such as pole gains, lag screws and crossarm braces are not provided.

Optional equipment that may be supplied with the cabinet includes an ac panel which provides a dual convenience outlet and a dual 15-ampere circuit breaker and a thermostatically controlled blower.

The ac panel is mounted at the bottom of the equipment mounting brackets. The blower is mounted below the ac panel and the blower motor control thermostat is mounted at the top right-hand side of the equipment mounting brackets.

Wiring for temperature control and blower motor is supplied as a basic part of the cabinet.

TELEPHONY'S Traffic Engineering Handbook

By Gilbert R. Brackett

Dec. 14, 1957

Part 6 (Continued)
Incoming Selectors

We shall assume there is a satellite location that will dial into this exchange and the CCS load over the tie trunks to be 95.

In the accompaning "Trunk Capacity Table," sub-table 10, we find the closest figure to 95 to be 105 which calls for eight trunks. One incoming selector is associated with each trunk, so eight incoming selectors are required.

Incoming first selectors equipped with dial tone must be specified when it is desired to furnish dial tone on a repeating tie trunk to indicate that further dialing is necessary to complete the call.

Should the tie trunk have a long loop, a repeater circuit must be provided at either end of the trunk.

An incoming selector should be considered as a first selector, feeding to central office trunks, to attendant trunks to regular second selectors and to special codes.

These levels are multipled to corresponding first selector levels and so the traffic from the same levels of the two types of selectors should be totaled to determine whether additional trunks are needed to any of the first selector special services.

To figure the effects of the load from the incoming selectors on other facilities in the office the following method may be used:

We shall assume still, that 95 CCS is the incoming load from the tie trunks, supplied through eight incoming selectors. We shall take for granted that the

TRUNKS	SELECTORS PER SUBGROUP: 320		240		160		120		80		60		40		20		TRUNKS
	CCS CAPACITY PER: SEL	GRP	SEL	GRP	SEL	GRP	SEL	GRP	SEL	GRP	SEL	GRP	SEL	GRP	SEL	GRP	
10	.47	149	.63	150	.95	152	1.28	154	1.95	156	2.65	158	4.10	164	9.10	182	10
11	.52	168	.71	170	1.08	172	1.45	174	2.20	176	3.00	180	4.65	186	10.30	210	11
12	.59	188	.79	190	1.20	192	1.62	194	2.47	198	3.37	202	5.25	210	11.90	238	12
13	.65	208	.87	210	1.33	212	1.78	214	2.73	218	3.75	225	5.85	234	13.20	264	13
14	.71	228	.96	230	1.45	232	1.95	234	2.98	238	4.10	246	6.45	258	14.50	290	14
15	.77	246	1.05	252	1.56	250	2.12	254	3.23	258	4.33	266	7.00	280	15.80	316	15
16	.82	264	1.11	266	1.68	268	2.27	272	3.48	278	4.77	286	7.60	304	17.10	342	16
17	.88	282	1.18	284	1.80	288	2.43	292	3.73	298	5.13	308	8.20	328	18.20	364	17
18	.94	300	1.26	304	1.91	306	2.60	312	3.98	318	5.50	330	8.80	352	19.20	384	18
19	.99	318	1.34	322	2.05	324	2.77	332	4.25	340	5.90	354	9.45	378	20.20	404	19
20	1.05	336	1.43	342	2.15	344	2.93	352	4.50	360	6.27	376	10.10	404	-	-	20
21	1.11	354	1.50	360	2.27	364	3.08	370	4.77	382	6.63	398	10.75	430	-	-	21
23	1.22	390	1.65	396	2.51	402	3.42	410	5.32	426	7.40	444	12.20	488	-	-	23
25	1.33	426	1.80	432	2.74	438	3.75	450	5.88	470	8.17	490	13.25	530	-	-	25
27	1.44	462	1.95	468	2.96	474	4.08	490	6.44	515	9.00	540	-	-	-	-	27
29	1.56	498	2.10	505	3.19	510	4.42	530	7.00	560	9.92	595	-	-	-	-	29
31	1.67	535	2.27	545	3.44	550	4.75	570	7.56	605	10.75	645	-	-	-	-	31
33	1.78	570	2.44	585	3.69	590	5.15	615	8.12	650	11.50	695	-	-	-	-	33
35	1.89	605	2.58	620	3.94	630	5.46	655	8.69	695	12.42	745	-	-	-	-	35
37	2.02	645	2.73	655	4.22	675	5.79	695	9.31	745	-	-	-	-	-	-	37
39	2.14	685	2.90	695	4.47	715	6.17	740	10.00	800	-	-	-	-	-	-	39
41	2.25	720	3.04	730	4.72	755	6.54	785	10.63	850	-	-	-	-	-	-	41
43	2.36	755	3.19	765	4.97	795	6.87	825	11.25	900	-	-	-	-	-	-	43
45	2.48	795	3.35	805	5.25	840	7.25	870	11.87	950	-	-	-	-	-	-	45
	320		240		160		120		80		60		40		20		

NON-GRADED GROUPS

TRUNKS	1	2	3	4	5	6	7	8	9
CCS CAPACITY	.4	5.4	16	30	46	64	84	105	126

Selector Multiple Table—10 Terminal Access—1 in 100

Hundred Call-Seconds and Per Cent Use at Various Service Levels for Group Sizes of 1 to 50

The table number indicates the number of calls per 1000 encountering all equipment in the group busy

Trunks	TABLE 1 CCS	TABLE 1 % Usage	TABLE 5 CCS	TABLE 5 % Usage	TABLE 10 CCS	TABLE 10 % Usage	TABLE 20 CCS	TABLE 20 % Usage	TABLE 30 CCS	TABLE 30 % Usage	TABLE 40 CCS	TABLE 40 % Usage	Trunks
1	.1	.1	.2	.5	.4	1.0	.7	2.0	1.1	3.1	1.5	4.2	1
2	1.6	2.3	3.7	4.8	5.4	7.5	7.9	10.9	9.7	13.5	11.3	15.7	2
3	6.9	6.4	12.2	11.3	15.7	14.5	20.4	18.9	24.0	22.2	26.9	24.9	3
4	15.4	10.7	24.2	16.8	29.6	20.6	36.7	25.5	41.6	28.9	45.7	31.8	4
5	26.6	14.8	38.9	21.6	46.1	25.6	55.8	31.0	61.6	34.2	66.6	37.0	5
6	40.0	18.5	55.4	25.7	64.4	29.8	76.0	35.2	82.8	38.3	89.3	41.3	6
7	54.7	21.7	73.4	29.1	83.9	33.3	96.8	38.4	105	41.7	112	44.4	7
8	70.9	24.8	92.5	32.1	105	36.5	119	41.3	129	44.8	137	47.6	8
9	88.2	27.2	115	34.9	126	38.9	142	43.8	153	47.2	162	50.0	9
10	107	29.7	134	37.2	149	41.4	166	46.1	178	49.4	188	52.2	10
11	126	31.8	156	39.4	172	43.4	191	48.2	204	51.5	214	54.0	11
12	145	33.6	178	41.2	195	45.1	216	50.0	230	53.3	240	55.6	12
13	166	35.5	201	42.9	220	47.0	241	51.5	256	54.7	267	57.1	13
14	187	37.1	224	44.4	244	48.4	267	53.0	283	56.1	296	58.5	14
15	208	38.5	248	45.9	269	49.8	293	54.3	310	57.4	322	59.6	15
16	231	40.0	273	47.4	294	51.1	320	55.6	337	58.5	350	60.8	16
17	253	41.3	297	48.5	320	52.3	347	56.7	365	59.6	378	61.8	17
18	276	42.6	322	49.7	346	53.4	374	57.7	392	60.5	407	62.8	18
19	299	43.7	347	50.7	373	54.5	401	58.6	420	61.4	436	63.8	19
20	323	44.9	373	51.8	399	55.4	429	59.6	449	62.4	465	64.6	20
21	346	45.8	399	52.8	426	56.4	458	60.6	478	63.2	494	65.3	21
22	370	46.7	424	53.5	453	57.2	486	61.4	507	64.0	523	66.0	22
23	395	47.7	451	54.5	480	58.0	514	62.1	536	64.7	552	66.7	23
24	419	48.5	477	55.2	507	58.7	542	62.8	564	65.3	582	67.4	24
25	444	49.3	504	56.0	535	59.4	571	63.4	593	65.9	611	67.9	25
26	469	50.1	531	56.7	562	60.1	599	64.0	623	66.6	641	68.5	26
27	495	50.9	558	57.4	590	60.7	627	64.5	652	67.1	671	68.9	27
28	520	51.6	585	58.0	618	61.3	656	65.1	682	67.7	701	69.8	28
29	545	52.2	612	58.6	647	62.0	685	65.6	711	68.1	731	70.0	29
30	571	52.9	640	59.3	675	62.5	715	66.2	741	68.6	762	70.6	30
31	597	53.5	667	59.8	703	63.0	744	66.7	771	69.1	792	71.0	31
32	624	54.2	695	60.3	732	63.6	773	67.1	801	69.5	822	71.4	32
33	650	54.7	723	60.8	760	64.0	803	67.6	831	69.9	852	71.7	33
34	676	55.2	751	61.4	789	64.5	872	68.0	861	70.3	883	72.1	34
35	703	55.8	779	61.8	818	64.9	862	68.4	891	70.7	913	72.5	35
36	729	56.3	807	62.3	847	65.4	892	68.8	922	71.1	944	72.8	36
37	756	56.8	836	62.8	878	65.8	922	69.2	952	71.5	975	73.2	37
38	783	57.3	864	63.2	905	66.2	952	69.6	982	71.8	1006	73.5	38
39	810	57.7	892	63.5	935	66.6	982	69.9	1013	72.1	1037	73.9	39
40	837	58.1	921	64.0	964	66.9	1012	70.3	1043	72.4	1069	74.2	40
41	865	58.6	950	64.4	993	67.3	1042	70.6	1074	72.8	1099	74.4	41
42	892	59.0	979	64.7	1023	67.7	1072	70.9	1104	73.0	1130	74.7	42
43	919	59.4	1008	65.1	1052	68.0	1103	71.3	1135	73.3	1161	75.0	43
44	947	59.8	1036	65.4	1082	68.3	1133	71.5	1166	73.6	1192	75.3	44
45	975	60.2	1066	65.8	1112	68.6	1164	71.8	1197	73.9	1223	75.5	45
46	1003	60.6	1095	66.1	1142	69.0	1194	72.1	1228	74.2	1255	75.8	46
47	1030	60.9	1124	66.4	1171	69.2	1225	72.4	1259	74.4	1286	76.0	47
48	1058	61.2	1153	66.7	1201	69.5	1255	72.6	1291	74.7	1317	76.2	48
49	1086	61.6	1183	67.1	1231	69.8	1286	72.9	1322	74.9	1349	76.5	49
50	1115	61.9	1212	67.3	1261	70.1	1317	73.2	1353	75.2	1381	76.7	50

Trunk Capacity Table

95-CCS load is distributed evenly over all four levels giving special services from the incoming selectors.

95 CCS ÷ 4 levels = 23.8 CCS per selector level.

Level "0"

Refer to level "0" computations and add these CCS to the total CCS for the 37 selectors of the partial group:

102 CCS + 23.8 CCS = 125. 8 CCS.

Referring to the accompanying "Selector Multiple Table—10 Terminal Access—1 in 100" (Non-graded groups) we find the closest figure to 125.8 is 126 which calls for 9 trunks, one more than was orginally engineered for this group.

And, so, should there be incoming selectors, the total computations for the "0" level would be:

120 First selectors multipled on 19 trunks

37 + 8 First Selectors multipled on 9 trunks

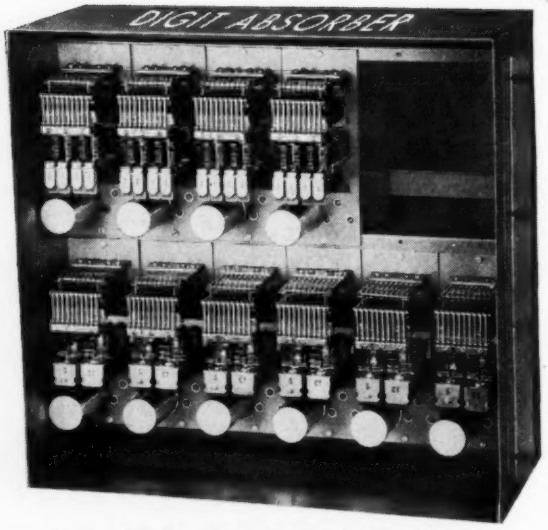
165 First selectors multipled on 28 trunks.

(Please turn to page 46)

XUM

Can your Switchboard handle

2-5 DISTANT DIALING?



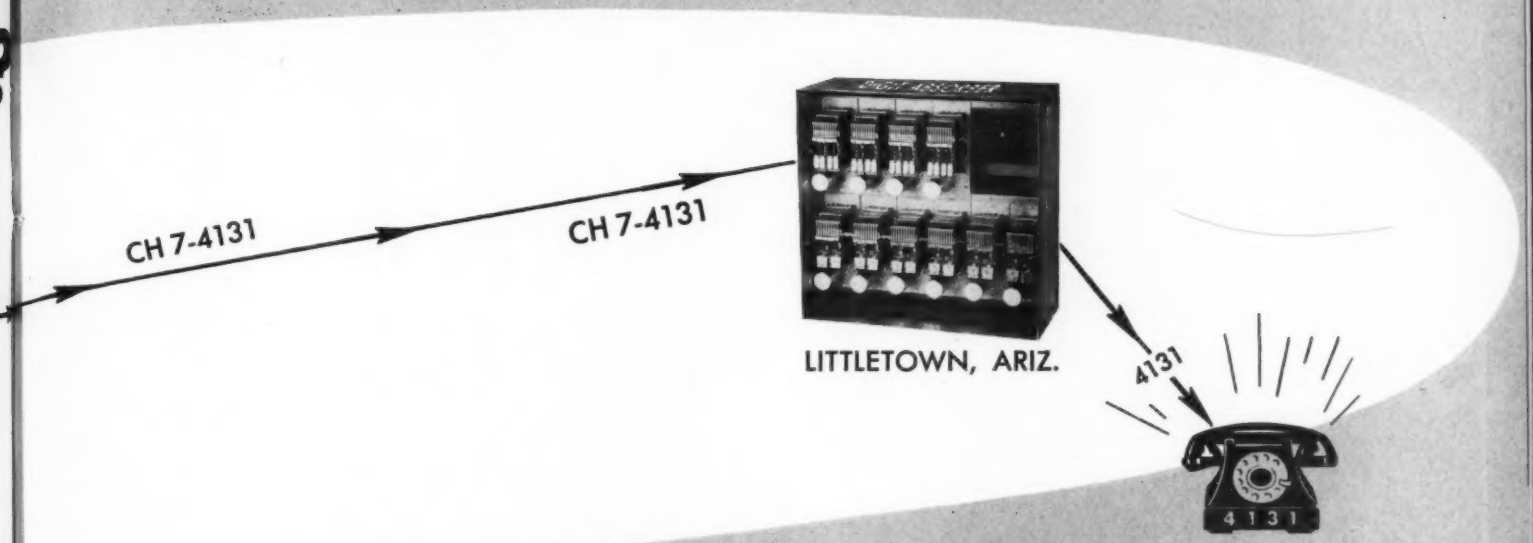
Typical Relay Case for Digit Absorber.

The Universal Digit Absorber employs simple circuity with a magnetic impulse counter, together with other standard relay apparatus of recognized manufacture.

Other UNIVERSAL Telephone Equipment:
Code-to-Selective RINGING CONVERTER
COMPUTER INTERCEPT

INDEPENDENT

It can with a UNIVERSAL DIGIT ABSORBER*



DIRECT DISTANCE DIALING REQUIRES A 2-5 CODE

The nationwide dialing plans for operator and direct distance dialing require that all stations be recognized by a 2-5 code. Few dial switchboards of earlier design have provisions for adding digit absorbing features economically. The Universal Digit Absorber fills this need easily and at nominal cost. Installation requires very little time.

The ever-increasing requirements of Extended Scope Dialing on a universal numbering arrangement are easily handled by the Universal Digit Absorber. The Digit Absorber is a factory assembled, fully-wired, applique unit that can be added to any existing dial switchboard to pad in three digits of exchange code (ABX) or four digits in the case of a small digit dial unit.

There are two types of Universal Digit Absorbers, depending on the complexity of the exchange codes assigned:

*19-S unit will handle exchange codes, as illustrated by AB-X, where the "X" digit is not a duplicate of the "A" or "B" digit.

*19-L unit is required where the "X" digit is a repeat of either the "A" or "B" digit.

In addition, Universal offers a Trunk Digit Register unit which can be applied to "Trunk on Line" dial units where five or more digits are required to be delivered to a 3 or a 4 digit tributary exchange.

*Pat. Pend.

TELEPHONE DIVISION

UNIVERSAL
CONTROLS CORPORATION
OFFICE AND PLANT – CARROLLTON, TEXAS
MAIL ADDRESS – P. O. BOX 13122, DALLAS 20, TEXAS

KELLOGG
A DIVISION OF I T & T

6650 S. CICERO, CHICAGO 38, ILLINOIS

SALES OFFICES

5924 S. PULASKI RD. CHICAGO 29, ILL.
1515 TURTLE CREEK BLVD. DALLAS 7, TEXAS
4501 TRUMAN ROAD KANSAS CITY 1, MO.
1555 WEST FOURTH STREET MANSFIELD, OHIO
23 BRODERICK ROAD BURLINGAME, CALIF.
1594 SOUTHLAND CIRCLE, N. W. ATLANTA, GA.
6100 EXCELSIOR BLVD. MINNEAPOLIS 16, MINN.
165 PROSPECT STREET PASSAIC, N. J.

Mail this coupon to the nearest address.

Gentlemen: I am interested in your Universal *Digit Absorber* for 2-5 Numbering.

Name_____

Position_____

Firm_____

Address_____

City_____ State_____

T-12-14

Out in the rolling Ohio countryside, 25 miles southeast of Cleveland, lies the charming village of Hudson, headquarters of Western Reserve Telephone Co.

One of the country's most progressive independents, Western Reserve is managed by the four Case brothers: Nelson, Ted, Baxter and Weldon.

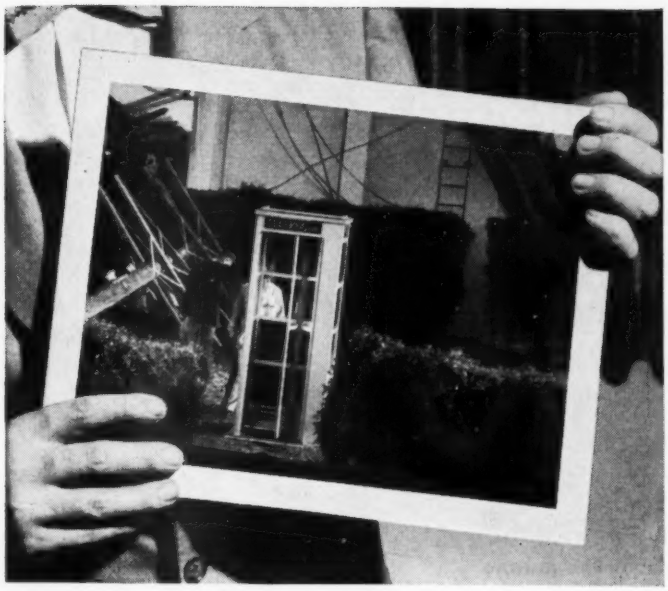
"OUR NEW ALCOA BOOTHS EARN $90 PER MONTH,"

Reports Nelson Case of Western Reserve Telephone Company

Western Reserve Telephone Company recently installed eight Alcoa® Outdoor Aluminum Booths and some are earning $90 a month and more—all additional income, since there has been no noticeable decrease in income from pay stations in nearby stores.

Why are Alcoa Booths such good revenue earners? Nelson Case reports, "These booths are attractive, they're eye-catching. People like to use them. They're nice and clean. They're big and roomy—33½" square. And they're brightly lighted at night so they earn money for us 24 hours a day."

Western Reserve is now in the process of adding new Alcoa Outdoor Booths.



"SOLID AND STURDY . . . that's what Alcoa Booths are, "says Western Reserve General Manager, Nelson Case. "Here's a picture of a booth in Florida that stood up under a 90-mph hurricane which leveled buildings all around it. Our booths are practically vandal-proof, but if a panel should ever be damaged we can easily replace it. The parts are interchangeable."

"IT TOOK ONLY FOUR HOURS TO PUT UP A BOOTH," reports Ted Case. "The booth comes in six subassemblies which lock together into a solid structure. The Alcoa instruction manual was very easy to follow and we also saw the movie about putting up the booths."

"WASHING IS THE ONLY MAINTENANCE our Alcoa Booths need," says Ted Case who supervises maintenance for Western Reserve. "Smudges and pencil marks wash right off. The booths stay bright and attractive. We'll never have to paint them or remove rust."

"WE GOT GOOD PUBLICITY about our new booths by using the Alcoa Good Will Kit," says Nelson Case. The Good Will Kit, given free with each booth purchase, contains newspaper ad mats, publicity release, free envelope stuffers, radio and TV commercials.

GET MORE INFORMATION ON ALCOA BOOTHS. Write for brochure. And ask your jobber how Alcoa Booths can increase your revenues and build customer good will. Aluminum Company of America 1690-M Alcoa Building, Pittsburgh 19, Pa.

WE CHOSE ALCOA ALUMINUM MILL PRODUCTS
ALUMINUM COMPANY OF AMERICA
©ALCOA

Your Guide to the Best in Aluminum Value

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

XUM

When is a Case of Trouble OK?

By L. N. MARTIN

THE MANAGER came to his office that morning in a happy state of mind—peaceful yet energetic. He was ready to cope with anything the day might bring forth. Nevertheless, his happy frame of mind was rudely interrupted by the first caller, an irate subscriber who was waving a telephone bill in his hand. "I won't pay this bill. My telephone has been out of order for more than a month. It is no use to me. Your service is rotten. If you can't fix the ———— thing, take it out. I'm going to complain to the commission, etc., etc." (Does that sound familiar?)

Here we have a difference of opinion about the same set of facts. Both parties are honest in their opinion. We are reminded of the three blind men who where told to examine an elephant and then describe it.

They first had to find the elephant in the perpetual darkness of the blind. One man found the elephant's tail. The second encountered its trunk. The third ran right into the wall-like middle section of the beast.

Their reports on the general appearance of an elephant were in radical disagreement, yet all were honest. We should remember that (with very few exceptions) *the subscriber is right, according to his own viewpoint.* And, if we are to succeed in any business we must please our customers.

How do such serious differences of opinion between the subscriber and the telephone company come about? There are many possible causes, but this article will deal with only one: The manner in which a case of trouble is "closed" or "OK'D."

Our first illustration will be taken from a recent experience at our own home. The locally-owned Independent company in our little city gives excellent service. Trouble is infrequent and the clearing time is usually satisfactory. However, one morning we found our telephone "out." (Our own diagnosis was "open.")

PART 61. The preceding article in this series appeared on page 40 of the December 7 issue.

On our way to an appointment we reported the trouble from another telephone. In less than an hour, Mrs. Martin saw a telephone man working on a pole back of the house. Later he knocked on the door and asked to check the telephone. She admitted him but as she was busy, paid no attention to what he was doing.

In a short time he quietly left the house and as she saw no more of him concluded that he had cleared the trouble. However, a few hours later when she tried to use the telephone it was still "out." It was still out when I came home that evening.

Now, as a retired telephone man, we try to be very patient with a telephone company. Perhaps they had an open cable pair with no spares. It might require some time to solve that problem. We waited several days with no telephone service and then went to the telephone office to find out as politely as possible what the score was.

The plant supervisor was very much surprised. His record showed that our trouble had been cleared in less than two hours after it was reported. He at once dispatched a repairman who promptly cleared the trouble. (We did not learn whether the second case was the result of faulty repairs on the first case, or whether it was an independent case of trouble.) The point to this story is: If the first repairman had told Mrs. Martin that he had cleared the trouble and the telephone was now ready for use, we would have reported the second case at once and avoided the loss of several days telephone service.

Our second anecdote is hypothetical but it is such a common experience that every telephone man will remember when it happened at his exchange. A large cable had failed after an electrical storm. Many of the subscribers (including one John Smith) had reported their trouble and were told that the storm had damaged a large cable but that the repair crew would work day and night until they had located and cleared the trouble. The subscribers were asked to be patient.

The trouble was cleared sometime after dark and the lines were reconnected and tested. There were a few opens and the pairs were changed on these. There were a few grounds outside of the cable which proved to be protector trouble and were cleared. At 10 p.m. all lines tested "OK" on a voltmeter test and the tired crew called it a day.

Next morning, John Smith found that his telephone was still out of order. He could not get dial tone and, although it rang once, there was no one on the line. However, the telephone company had asked him to be patient and he was willing to go along with it.

Several days passed. The telephone was still out but he'd agreed to be patient.

Several more days went by. Mrs. Smith was not so patient and, at her urging, Mr. Smith went to the telephone office with a tale of woe. "My telephone has been out for more than a week. Looks like you people could find some way to fix that cable."

Now, the telephone people could hardly believe that. Their record showed that Mr. Smith's trouble had been cleared at 10 p.m. on the day that it was reported.

However, they sent a repairman to his home who found that one winding of the induction coil in the telephone had been burned open, probably by the same lightning that had caused the cable trouble. (This type of trouble would not be detected by a voltmeter test.) What was wrong in this case?

This misunderstanding and loss of service would have been avoided if the

testman had called each subscriber who had been involved in the cable trouble. But, it was 10 p.m.—no time to be disturbing the subscribers. However, it could have been done the next morning and in all cases where the subscriber answered, the trouble could be closed as of 10 p.m. the previous day.

These two examples support our contention that a case of trouble should not be "closed" until the repairman or the testman has told the subscriber that the trouble has been cleared and the telephone is ready for service.

If the subscriber does not answer the testman's call, he may not be at home. Just lay the case aside for a few hours and try again. If the subscriber does not answer within a reasonable time, it may be because he *cannot* answer. Send a repairman to investigate.

Another circumstance that may cause a subscriber to believe that his telephone has been out of service for a month or more is "repeated trouble." Suppose that Mr. Jones has had five cases of trouble within 30 days each of which was cleared with reasonable promptness.

To the telephone company, it may seem unfortunate that Mr. Jones had more than his share of trouble that month, but each case was cleared promptly was it not? What more could they do?

Now, Mr. Jones may forget the many times that he has used his telephone without trouble, but he will remember very vividly the times he tried to use it and found it out of order. Those cases of trouble may have occurred at the very time he had the most urgent need for telephone service. It is easy to see how Mr. Jones can honestly believe that his telephone was continuously out of service for a month. In any case, he is justified in making a strong complaint.

Repeated trouble may be variously defined. One company's definition is: "Any case of trouble affecting service that is reported 30 days or less after the previous case was cleared, whether or not it had any relation to the previous case."

A repeated case of trouble should be an alarm signal. Some companies enter it in red on the trouble record. Some also refer the cases to the head of the plant organization in that exchange.

A repeated case of trouble should never be dismissed as a "coincidence." A coincidence, like an accident, does not just happen. It is usually *caused.* Strict attention to this subject will prevent many cases of angry and misunderstanding subscribers.

Cases of trouble closed as "Test OK" or "Found OK" should receive special attention. "Test OK" means that a case of trouble has been reported and the testman decides, after making voltmeter and other tests including (we hope) a talking test with the subscriber, that no trouble now exists and there is no need for further investigation.

"Found OK" implies that a repairman has been dispatched who finds that the telephone is not now in trouble and he cannot determine a probable cause for the report.

"Test OK" and "Found OK" cases may have been caused by transient trouble that may never occur again. However, they may be disappearing trouble that may return again and again before being found—a very annoying type of trouble. Repeated "Test OK" or "Found OK" cases are a clear warning that something is wrong.

What should the subscriber be told when the company cannot find the trouble that he has reported or any other trouble with his service? Above all, *do not let the subscriber think that the company questions his report.* We suggest something like the following:

"I have tested your telephone and it is in perfect condition *now.* I do not doubt that you did experience trouble at the time you made the report and we are glad that you did report it so promptly.

"This trouble may never come back and I hope that it does not, but if this should occur again or you have any other kind of trouble, do not hesitate to call us."

The last condition that we will discuss is a case of genuine "Disappearing Trouble." It may be a short, ground, open, cut out, fade out, or noise that disappears again and again before it is located and cleared. Such cases are not very frequent but they occur often enough so that every telephone man will remember one or more such cases at his exchange.

These cases are annoying and expensive for the company, and they may be even more annoying to the subscriber, and if not diplomatically handled may result in a serious complaint and a thoroughly dissatisfied subscriber.

The technique of finding such cases is beyond the scope of this article as our present purpose is to discuss the subscriber relation in such cases. However, we will offer a few suggestions:

The most likely place for a disappearing open is in a fuse and the next most likely location is a cable pair which has burned open, but which makes contact most of the time. Sometimes, these opens are cleared by the ringing current and remain closed for some time, but finally go open again after the line has had a rest.

In this case, the trouble is always OK when the testman rings the subscriber, but an hour or so later the subscriber cannot get dial tone or operator. Temperature changes may also cause this trouble to come and go and in the case of a fuse, humidity changes may have the same effect.

One way of clearing this trouble is to eliminate one part of the plant after another, such as changing the cable pair, replacing the instrument, replacing the protector, etc. These changes must be made one at a time and with a long-enough interval between so we can determine what part of the plant is at fault. This is, of course, a long and annoying process for the subscriber. Now, how should the company deal with the subscriber in case of a disappearing trouble?

Let us take the subscriber into our confidence. He may be better acquainted with disappearing trouble than we think. Perhaps he has had disappearing trouble in his car. (The writer has had several such cases.) His car has failed on the road and caused him a serious delay. Then all at once it started again and seemed to be in perfect condition.

At the first opportunity he takes the car to a repair shop, but the mechanic can find no cause for the trouble. Now, if the mechanic is honest he will tell the customer the truth, but another mechanic may pretend to make some repairs or replace some parts and bill the customer accordingly. A few days later the same trouble occurs again when the motorist is far from help. (It seems unnecessary to say that the honest mechanic will be more likely to get the next job.)

Let us be frank with our subscriber. Let us ask his cooperation (we may need it). Give him the testman's service number and ask him to call the testman direct rather than the repair clerk.

Ask him to go to the nearest telephone and call while the trouble is on, and, in the meantime, not to disturb the telephone that is in trouble. This gives the repairman a better chance to "sneak up" on the trouble while it is there.

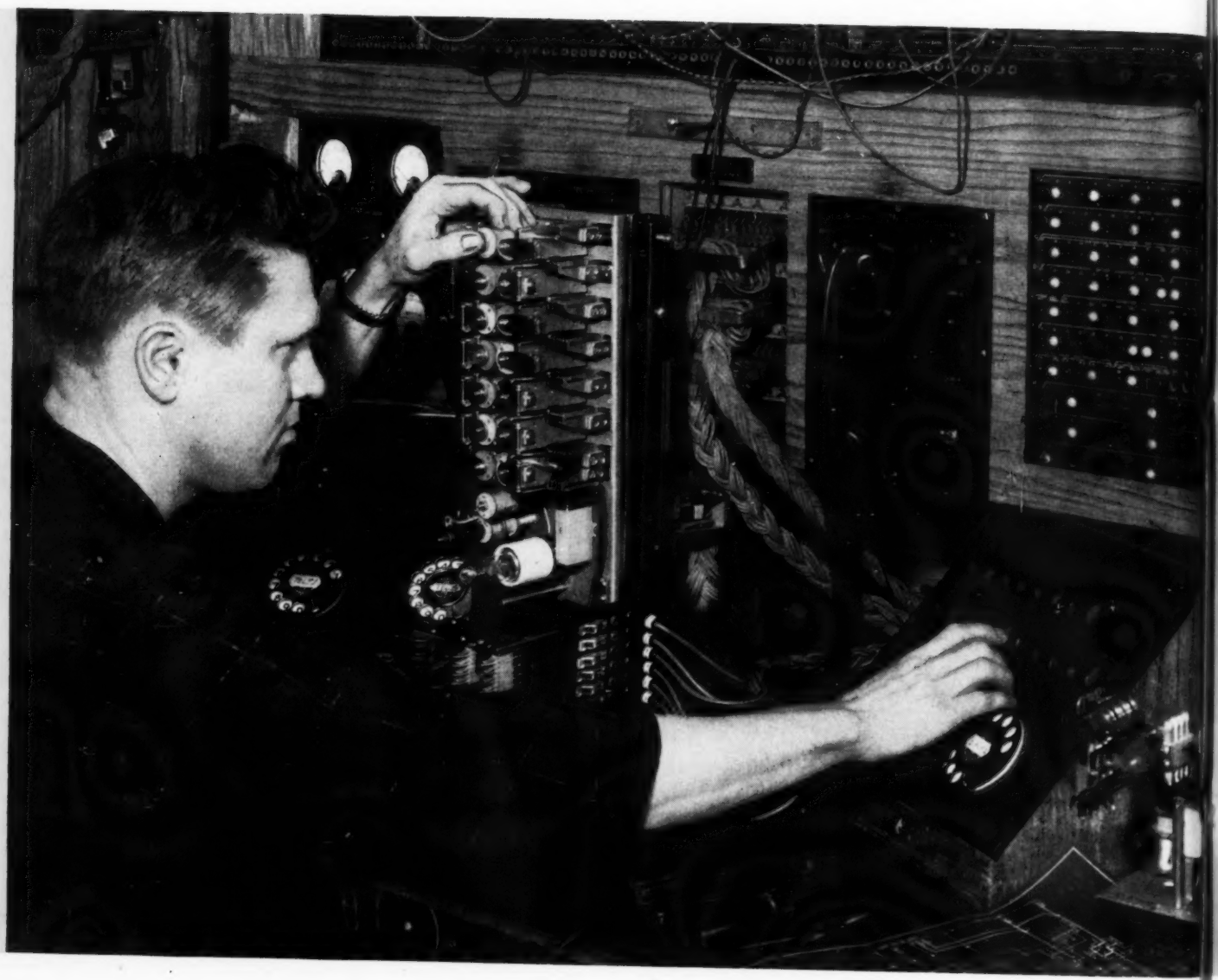
Let the subscriber know at frequent intervals that the company has not gone to sleep on the case. And, of course, the subscriber is entitled to, and should receive, a rebate for his poor service and the cooperation that he has given the company.

How should such a case be handled on the trouble record? We have a choice of a long series of "Test OK's" and "Found OK's," or of *one* case carried

(Please turn to page 45)

XUM

YOUR STROWGER AUTOMATIC E



EQUIPMENT
is tested for your service

Just before it is shipped, your Strowger Automatic telephone equipment proves its fitness for your specific service. Each unit is put through its paces under conditions as close as possible to those in your exchange. Strowger *must* pass these tests with flying colors before it is tagged "OK to ship."

To make these tests, Automatic Electric process engineers have devised testing equipment which reproduces the varied circuit conditions in your telephone service. The performance of the switches is carefully checked under the most unfavorable conditions that will be encountered in actual operation.

This is only the last in a series of many tests which are made at every step in the production of Strowger Automatic telephone equipment. They are your assurance of long wear and dependable service when you choose Strowger!

AUTOMATIC ELECTRIC

A member of the General Telephone System—One of America's great communications systems

NORTHLAKE, ILLINOIS

GENERAL SYSTEM

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General Employes Prove Extra Service Can Be Sold

Everyone who entered the business office of the General Telephone Co. of the Southwest exchange at Tahoka was reminded that an additional telephone in the home was a real bargain. Competition between departments was stimulated by employes with signs throughout the exchange.

GENERAL Telephone Co. of the Southwest has just completed its most successful additional telephone campaign which resulted in a net station gain never before reached by the company in any one month. The campaign conducted during the month of September brought about the sale of over 2,400 extensions and 750 primary stations as well as many miscellaneous services representing annual revenues of over $104,800. Net station gain for September was 2,753 which topped the previous high set in June of 1949.

However, the company says there's no secret to selling additional telephones, it's just a simple matter of telling about them. But the company does believe they have hit upon what might be the secret of stimulating enough interest among employes so that they want to "tell and sell."

In fact, the success of General's company-wide campaign, which emphasized the sale of residence extensions, is attributed almost entirely to the fact that friendly competition and employe interest throughout the company was stimulated through months of careful planning.

A résumé of some of the planning is outlined below. It is the opinion of General's commercial department that the timing and continuity of the campaign played an important role in the success of the program.

Actually the promotion for the campaign first began when the company's parent organization, General Telephone System in New York, advised in April, 1957, that its national advertising and promotion program for September, 1957, would concern extension or additional telephones. This meant that system-coordinated advertising in newspapers, on truck posters, and counter cards would concern extension telephones.

The first company-wide plans for the September Extension Campaign were released on May 15 from the General commercial department which coordinated the entire sales program. This May 15 communique was an announcement to all division and district managers and division sales engineers that the campaign was to be held.

The kick-off letter urged that the phrase "additional telephones" be used throughout the campaign instead of "extension telephones" because many subscribers misinterpreted "extension" to mean a telephone with a long cord.

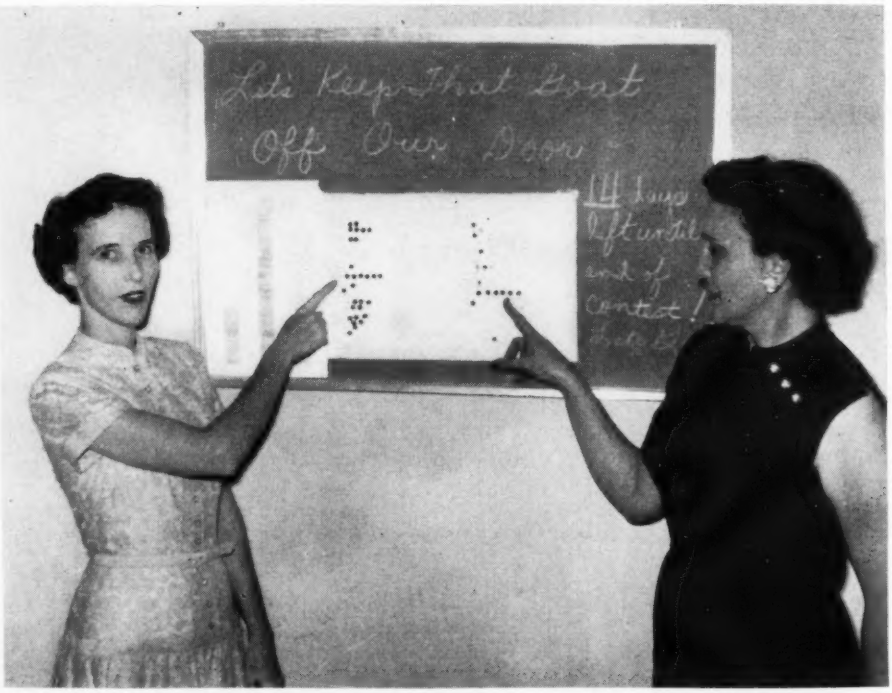
The letter also stated in part, "This campaign will consist primarily of calling as many subscribers as possible, as we have done in the past, plus special emphasis on the use of the "packaged selling approach" to *every* applicant for new service and every subscriber having a telephone moved.

This was followed up with weekly cartoon bulletins for all company bulletin boards. These same cartoon bulletins, which reminded all employes to "Plan Ahead," "Make your prospect list for the September Sell-Additional-Telephones Campaign Now," etc., were also directed to the special attention of all department and section heads throughout the company.

Early in July, division and district managers and division sales engineers were advised of residence extension quotas for the entire company, each division, each district and each exchange. A further break-down on quotas stated the number of additional telephone sales expected to new subscribers and the total expected results from move order contacts.

Mid-July sales activities includes a meeting in the company's general offices of all division sales engineers. The meeting agenda included emphasis on the importance of the campaign and was conducted by the general commercial manager and general sales engineer.

Late July brought an announcement of 70 prizes which would be awarded to winners. Top salesmen in plant, traffic and commercial on a company-wide basis were to be the winners, thereby creating competitive interest



Extension sales were posted daily in the Carlsbad, N. M., traffic department during General Telephone's Sell Additional Telephone Campaign in September. Ann Brazell, chief operator at Carlsbad, and Jean Mears point at the revealing quota chart. The Carlsbad and Hobbs traffic departments held their own contest-within-a-contest which further stimulated company-wide competition.

at all organizational levels throughout the company.

At this time, each division was urged to follow up general office communiques and cartoon bulletins with their own posters and promotion and were urged to use any other media which might stimulate local interest among all employes.

Another step in the sales program was sent out late in August advising all division and district supervisory people, cashiers and chief operators how and when sales were to be reported to the general commercial department.

The extent of the cooperation throughout the company can be illustrated by the fact that the general traffic manager wrote field traffic personnel authorizing them to furnish traffic people where needed and when available to make calls to the subscribers during the campaign.

At meetings of plant men in every district throughout the company, the drive was discussed and every plantman was urged never to miss an opportunity to "Tell and Sell." These actions both proved beneficial as did the sales coordinator's plan to increase future sales promotion, particularly in the plant department.

Such preliminary planning led to quick action and immediate results. In fact, the western division campaign, which netted more extension sales than any other division, passed its quota only three days after the campaign opened. This division's total sales amounted to 47 per cent of the company-wide gain resulting from the sales program.

However, four divisions exceeded the goals set for them and the company-wide results exceeded the goal by 63 per cent.

The general commercial manager attributes the outstanding success of the company's western division program to the simple fact that western division personnel "told" more people about the convenience of additional telephones and therefore "sold" more than any other division.

Interest reached such a peak in this division, that many of the employes painted bumper signs in water color on their own cars which stated "Need an Extension—Dial Zero."

Friendly, but intense, competition went on all month between individuals, departments, towns and districts. At division headquarters, the department head whose department had the smallest total sales for the week preceding, had a rather unattractive toy shrunken head on his desk until his department's standing improved. Other exchanges permitted local and long distance operators to volunteer for hourly telephone solicitation tours which were conducted from the operator's lounge.

Amusing and revealing stories came out of the campaign. For instance, one call made by an assistant cashier resulted in the sale of an extension telephone to the occupant of a one-room house. Another sale was the result of a bumper sign on a traffic employe's car. A passerby noticed the sign, and asked the car owner if he could order an extension.

Still another extension was sold after an operator explained to the subscriber over the telephone the step-saving advantage of a telephone in the kitchen. The subscriber said she had wanted an extension in her kitchen for some time. The installer arrived at the house later to find that it was to be installed in a two-room house, giving the subscriber a telephone in each room. A mere mention of the convenience of more than one telephone in a home, sold three extensions during a primary installation being made by a plant employe.

Final conclusion: If a company tells and sells an additional telephone campaign to its employes, the employes tell and sell step-saving, convenient and inexpensive additional telephones to subscribers—which help to improve earnings, which help to improve service, etc., etc., etc.

1958 Convention Calendar

Association	*Date*	*City*	*Hotel*
Louisiana	Feb. 12 and 13	New Orleans	Jung
Minnesota	Feb. 17, 18 and 19	St. Paul	St. Paul
Texas	March 3 and 4	Dallas	Baker
Kentucky	March 4	Lexington	Phoenix
Iowa	April 8 and 9	Des Moines	Fort Des Moines
Ohio	April 14, 15 and 16	Columbus	Deshler-Hilton
Nebraska	April 22 and 23	Omaha	Paxton
Indiana	May 7 and 8	Indianapolis	Claypool
Wisconsin	May 14 and 15	(City and hotel unannounced)	
Illinois	May 21 and 22	Peoria	Pere Marquette
Kansas-Missouri*	May 26 and 27	Kansas City	Town House
Pennsylvania	May 26, 27 and 28	Bedford	Bedford Springs
Maine-New Hampshire-Vermont*	June 3, 4 and 5	Rockland, Maine	Samoset
California	June 4, 5 and 6	San Francisco	Sheraton-Palace
New York	June 16, 17 and 18	Schroon Lake	Scaroon Manor
Michigan	Sept. 9, 10 and 11	Grand Rapids	Pantlind
Rocky Mountain	Sept. 17, 18 and 19	Salt Lake City	Utah
USITA Annual convention	Oct. 13, 14 and 15	Chicago	Conrad Hilton
Virginia	Oct. 30 and 31	Roanoke	Roanoke
Oklahoma	Nov. 5 and 6	Oklahoma City	Huckins

*Joint Convention

Bright Side of Hard Times

"The greater the difficulty the more glory in surmounting it. Skillful pilots gain their reputation from storms and tempests."—EPICURUS.

Party-Line Hog Causes Fire Damage, Denver Mother Says

A 33-year-old Denver mother of seven children was trapped for several minutes recently in her burning home with exits blocked. Her screams of fire did not impress a woman who refused to relinquish the telephone party line so the mother could summon aid.

Mrs. T. G. Pless led three of seven children to safety after kicking the front door until a jammed lock broke free. The four other children were at school.

After breaking out of the burning house she ran next door to a neighbor and telephoned the fire department. She blamed time lost haggling with the party line user for loss of nearly all the family's personal possessions.

The party line user who is charged with refusing to give up the line has denied that anyone had asked her to do so.

Officials of the Mountain States Telephone & Telegraph Co. are reported to have refused to release any information concerning the two telephones. However, they are reported to have offered to supply the fire victim with any party line information they may need for legal action.

Interrelationship

"The sciences are of a sociable disposition, and flourish best in the neighborhood of each other; nor is there any branch of learning but may be helped and improved by assistance drawn from other arts."—BLACKSTONE.

XUM

Students Given Special Exhibit Preview at Virginia Convention

ONE OF THE FEATURES of the annual convention of the Virginia Independent Telephone Association was a special preview of manufacturers' exhibits for senior engineering students of Virginia Polytechnic Institute, University of Virginia and Virginia Military Institute (TELEPHONY, Aug. 3, 1957.) The convention was held Oct. 24 and 25 in Roanoke.

The association registered 57 engineering students who viewed the latest telephone equipment and techniques during the afternoon before the convention opened. The students showed a great amount of interest in the exhibits, and it is hoped that other state telephone associations will consider arranging such previews for engineering students of colleges and universities located in their respective states. This is one good medium to attract young engineers and technicians to the telephone business.

The convention was presided over by President Walter G. Robertson of Warsaw, and presiding over the general departmental conferences was Wilson B. Garnett of Charlottesville.

To meet the challenge of the future, we will need better earnings, good public relations and sound organization, said Arthur W. Harrison, assistant vice president of the Chesapeake & Potomac Telephone Co. of Virginia.

He also stated, "The public expects us to keep in tune with the times. For example, suburban and country living have created a clamor in our territory for wider range local calling. . . . A similar demand may 'spill over' into some of your areas."

Clive W. Haas of Big Timber, Mont., president of the USITA, in his speech before the assembly, cited the difficulty of raising money to finance needed expansions. He said telephone companies have to make $4.00 investment to get back $1.00 in annual revenue.

The business session was presided over by President Robertson, who also presented his annual report. The report of the secretary-treasurer was given by Conrad J. Logan.

The industry must continue to provide the high type of service people of the state have come to take for granted, said E. D. Peterson, C&P's general service representative.

"Our industry can take pride in the manner in which it has met the growing needs of the commonwealth of Virginia," he said. "Our service has been high quality, and the public has come to expect a high grade of telephone service."

1957-1958 officers of the Virginia Independent Telephone Association are, left to right: C. Lacy Compton of Manassas, second vice president; W. G. Robertson of Warsaw, retiring president; H. P. Cavendish of Harrisonburg, new president; W. B. Garnett of Charlottesville, secretary-treasurer, and C. J. Logan of Tarboro, N. C., first vice president.

Between 1947 and 1957, he stated, the number of telephones in the state more than doubled—from 467,000 sets in service to 1,045,000. By 1967, he estimated, there will be 1,750,000 telephones in use in Virginia.

Gordon Saunders of Durham spoke on "What Management Requires from the Traffic Organization."

Richard F. Hardy, president of General Telephone Credit Co., Inc., spoke on "Independent Financing Today," the full text of his speech appearing in the Dec. 7 issue of TELEPHONY.

From the customer's standpoint, transmission is the telephone industry's principal product, J. B. Spratley, staff engineer-transmission of the Chesapeake & Potomac Telephone Co. of Virginia, told the convention.

"It seems to me that our customers are ordinarily little concerned with the mechanics of the switching operations," he said, "but they are greatly concerned if transmission is not what they think it ought to be. Consequently, from the customer's standpoint, transmission is our principal product."

Mr. Spratley stated that the job of giving telephone service consists, in general, of two important parts:

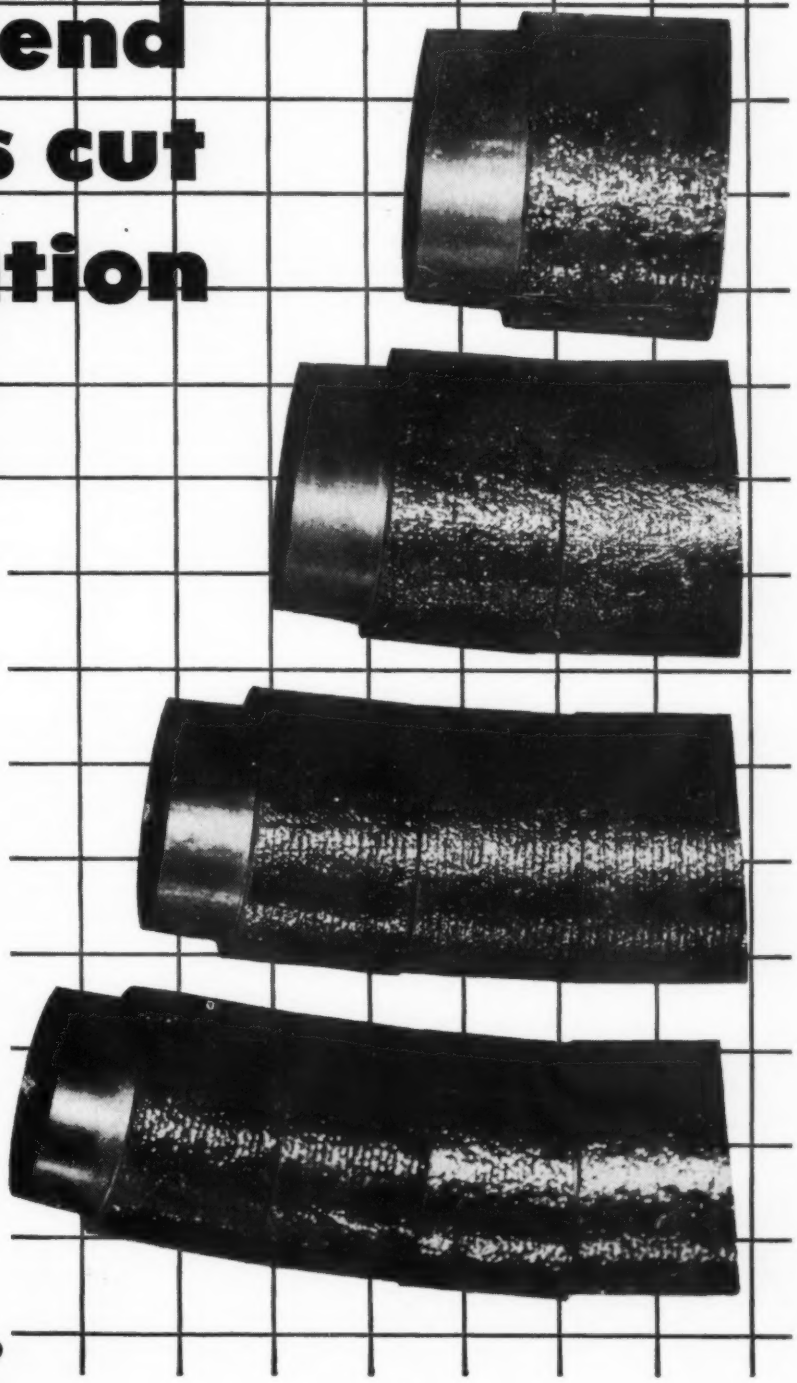
"*Switching*, which provides the path or channel from any one customer to any other customer.

"The provision of these paths or channels in accordance with an economical pattern is a function of the General Toll Switching Plan. As you know, the General Toll Switching Plan is a joint undertaking of the Independent and Bell System companies.

"*Transmission*, which includes everything necessary so that people who have been connected together can talk to each other easily, naturally and economically.

"Transmission for toll is superim-

These bend sections cut installation costs



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Crossovers . . . transformations . . . offsets . . . can be made in the field by joining sections together to obtain the desired direction change. No costly delays . . . no special bends needed.

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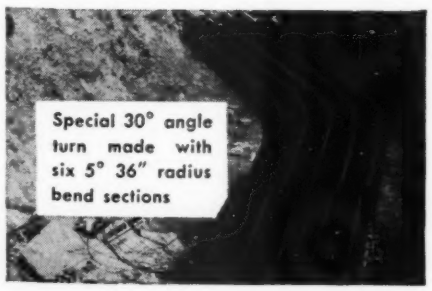
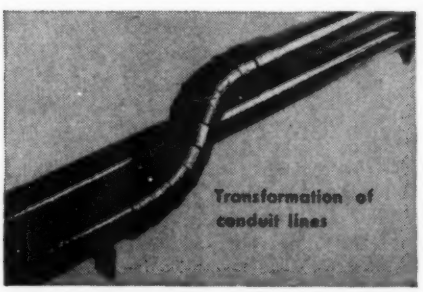
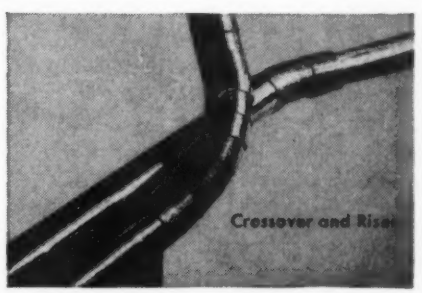






XUM

posed on the General Toll Switching Plan."

"Good transmission is not a luxury—it is a necessity and requires teamwork among all the members of the telephone industry in Virginia," continued Mr. Spratley.

"The failure of any member to meet the transmission objectives affects the service on calls to and from all other companies. We have gone a long way toward improving transmission in recent years, and we must continue to improve in order to keep up with the continuing public demand for better service.

"Surveys which have been made indicate that our customers are no better satisfied with the transmission being furnished today than they were with the somewhat poorer transmission of 10 years ago," Mr. Spratley concluded.

George E. Dodrill, REA engineer, discussed the dial-operated radio-tele-

Photographed before the registration booth, left to right: C. P. Lamm of Charlottesville, convention chairman, and V. L. Choate of Martinsville, registration committee chairman.

phone equipment which was demonstrated by REA on Dec. 12 and 13 on the system of the North Florida Telephone Co. of Live Oak, Fla.

He also referred to the installation of dial-operated radio equipment installed in May by the Central Virginia Telephone Corp. of Amherst, Va. This installation was discussed in page 69 of the Sept. 28 issue of TELEPHONY.

Several years ago REA realized, he said, that since dial exchanges are used by most REA borrowers (and very seldom do they operate a toll board where operators are used), the only kind of mobile service that could be offered to the public would be either a dispatch type or an automatic dial-operated type.

In the dispatch type of service employes handle calls to and from mobile vehicles during regular office hours. While this type of service is limited in value to the general public, it is valuable to a telephone company for use in the maintenance and operation of its system, Mr. Dodrill stated.

Under present FCC rules and regulations, he continued, frequencies are not available solely for use in the maintenance and operation of a telephone system.

However, channels which are allocated for common carrier mobile service may be used by a telephone company for its own use if a public offering is made to provide mobile service to those in the area who desire it. A dispatch type of service will meet this requirement, the speaker stated.

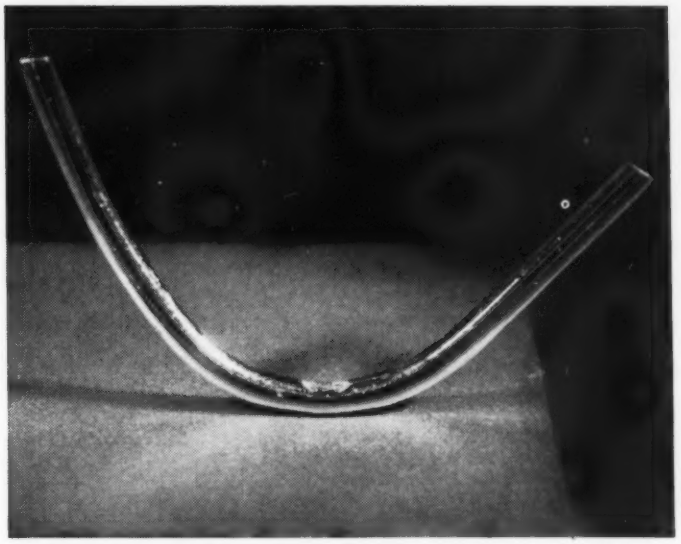
Group at the ladies' luncheon (front row, left to right): Mrs. Kermit Land of Pungo, Va.; Mrs. L. J. Denney of Amherst, Va.; Mrs. C. W. Haas of Big Timber, Mont.; Mrs. W. G. Robertson of Warsaw, Va., and Mrs. C. P. Lamm of Charlottesville. Back row: Mrs. Duane Swanson, Mrs. W. B. Garnett, both of Charlottesville; Mrs. Conrad J. Logan of Tarboro, N. C., and Mrs. Garland LaPrade of Martinsville, Va.

The dispatch type of operation is more valuable to the telephone company for its own use if the base station equipment is so arranged that the received signal can be transmitted when desired. This would permit mobile units to communicate with each other without having someone at the office at night to repeat orally all messages between the mobile units, he said. Thus, two mobile units can communicate with each other as long as both are within radio range of the base station. The base station in this case is operating as a mobile relay station. Mr. Dodrill observed:

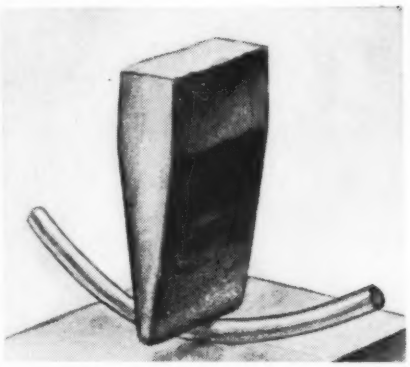
"For a telephone company that has dial exchanges but no switchboard operators, dial-operated radio equipment is the only economical method of pro-

Photographed at the Virginia convention, left to right: Mrs. W. G. Robertson of Warsaw; Clive W. Hass of Big Timber, Mont., president of the USITA, and Mrs. Haas.

Thermo-compression bonding—



Wire bonded to germanium by thermo-compression technique (enlarged). Wires only 1/10 the breadth of a human hair have been successfully anchored to germanium wafers only three hairs thick. The bond may be an ohmic contact or rectifying contact by adding suitable impurities to the wire and the semiconductor.



One method of thermo-compression bonding. A heated wedge presses a wire against a heated semiconductor with enough force to deform the wire. Adhesion occurs in seconds.

new way to join metal to semiconductors

Thermo-compression bonding provides a new way to attach a wire to a semiconductor. It calls for heat and pressure—nothing else. The wire and the semiconductor are moderately heated, then pressed together under moderate pressure. The resulting bond is very strong—stronger actually than the wire. No chemical flux or molten metal is required.

Eliminating molten metal provides an enormous advantage in fixing electrical connections to transistors. That's because molten metal tends to spatter and spread uncontrollably over the surface of a semiconductor. And it may alloy with the semiconductor to alter its all-important crystalline structure and chemical purity. Thermo-compression bonding easily and quickly makes a strong permanent electrical connection without damaging the semiconductor. Furthermore, the lead may be attached to microscopic areas and precisely positioned, a most valuable aid in the construction of high-frequency transistors.

Thermo-compression bonding will speed the production of transistors . . . the transistors needed to fill all the new jobs Bell Laboratories finds for them in the quest to provide still better telephone service to our growing country.

At Bell Labs Howard Christensen and Orson Anderson discuss their discovery of new bonding principle with Peter Andreatch, Jr., who collaborated in the studies.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

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viding 24-hour radio-telephone service to mobile and rural subscribers.

"Dial-operated mobile equipment may be used to provide radio-telephone subscriber service in vehicles. It may be used to provide radio-telephone services to residences, ranches and resorts in remote locations where construction of wire line facilities is impractical.

"Dial radio-telephone equipment may also be used in a telephone company's own vehicles for use in the construction and maintenance of its facilities."

For several years, Mr. Dodrill indicated, the REA had tried to interest radio manufacturers in designing and manufacturing mobile dial radio equipment. The manufacturers could not be convinced at that time that there was a market large enough for them to design and manufacture this type of telephone equipment. In May 1956, however, specifications were written and telephone and radio manufacturing companies were invited to submit bids on furnishing two mobile radio-telephone units, one rural subscriber station, and one base station with the associated antennas and coaxial cable transmission lines.

Re-elected directors of the association are Conrad J. Logan of Tarboro, N. C., and Stanley A. Owens of Manassas. Newly elected directors are L. John Denney of Amherst; L. Vernon Snyder of Lexington and V. L. Choate of Martinsville.

The directors in turn elected: President, Harry P. Cavendish of Harrisonburg; Wilson B. Garnett of Charlottesville, secretary-treasurer; Conrad J. Logan of Tarboro, first vice president; C. Lacy Compton of Manassas, second vice president.

Obituaries

GERALD W. THOMAS, 50, co-owner of the Standard Telephone Co., Marshall, Ark., died of a heart attack in Cotter, Ark., recently.

A native of Dorchester, Neb., Mr. Thomas had lived in Marshall since 1948.

Survivors include his wife, Mrs. Leona Thomas; his mother, Mrs. Edna Thomas of Galloway, Neb.; two brothers, Lawrence Thomas of Cotter and Charles Thomas of Galloway, and a sister, Mrs. Lenore Hobn, Pasadena, Cal.

•

DAVID E. PETERSON, 77, founder, president and general manager of the Midway Telephone Co., Medford, Wis., died recently, it was reported on Dec. 1.

Power of Example

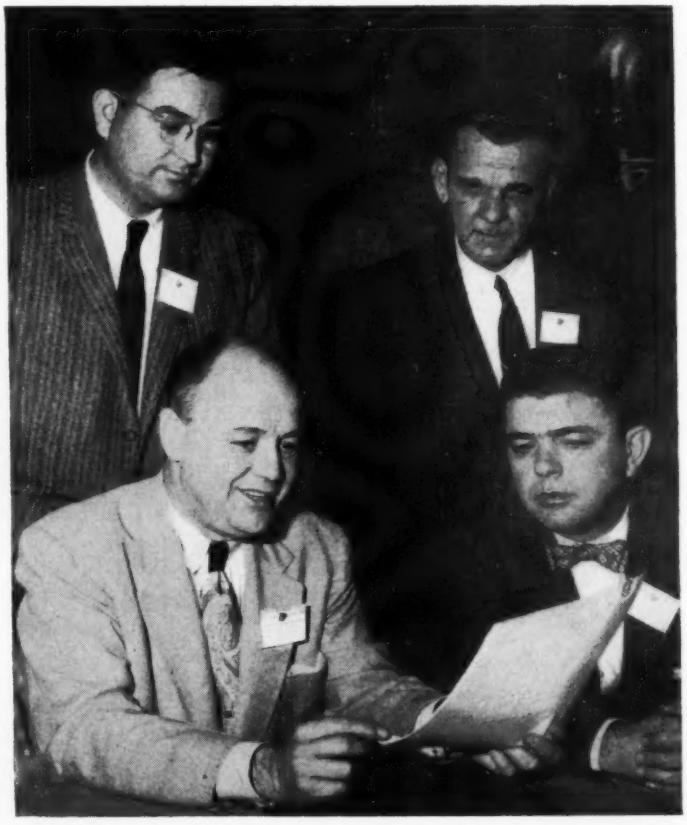
"You can only make others better by being good yourself."—HUGH H. HAWEIS.

Speakers at the 35th annual convention of the Georgia Telephone Association were, left to right: L. W. Hill, L. T. Robertson, J. S. Seigle, and Ben Wiggins (right). Second from right is Downing Musgrove, association president.

Georgia Association Holds 35th Annual Convention

ABOUT 175 representatives of the 78 telephone companies serving Georgia met at the General Oglethorpe Hotel in Savannah, Ga., on Nov. 13 and 14 for the 35th annual meeting of the Georgia Telephone Association.

Speakers were Ben Wiggins of the Georgia Public Service Commission; J. S. Seigle, vice president and general manager of Southern Bell Telephone & Telegraph Co.; L. T. Robertson, Georgia transmission and protection engineer of the Southern Bell company, and L. W. Hill, chairman of the board of Carolina Telephone & Telegraph Co., Tarboro, N. C., who represented the United States Independent Telephone



Officers of the Georgia Telephone Association. Seated, left to right: Downing Musgrove, President, and James Evitt, vice president. Standing, left to right: C. B. Lanier Jr., vice president, and H. H. Cabaniss, secretary-treasurer.

Association, of which he is a director and past president.

Downing Musgrove of Homerville, was re-elected president of the association. Elected vice presidents were James Evitt of Ringgold and C. B. Lanier of West Point. H. H. Cabaniss of Atlanta was re-elected secretary-treasurer.

Ernest Rogers, Atlanta *Journal* columnist, was the guest speaker at the banquet which was the climax of the convention. His talk, entitled "More Otherwise than Wise," consisted of anecdotes and stories.

In his address Mr. Wiggins commended the "wonderful progress" made by Independent telephone companies of Georgia. In commenting on progress made since World War I, he said Independent companies in the state have increased the value of the gross plant in service from 4.9 million dollars to nearly 30 million dollars today. The number of Independent stations has grown from 28,890 to 103,680 as of December 31, 1956.

"I am sure that by the end of this year the Independents will have passed the 110,000 stations at the present rate of increase," Mr. Wiggins declared. "This is indeed a remarkable record which could not have been accomplished if they had not believed in themselves and this great state of ours," he said.

Money for this extensive expansion did not come easily, the speaker stated. Since 1950, some 10 million dollars have been advanced by the Rural Electrification Administration, the rest from private financing, personal funds, salaries which have been plowed back into the business and from funds set aside for depreciation.

The responsibility for good service "must rest squarely on your shoulders," the commission representative declared. The responsibility for adequate rate structures "must rest squarely on our (commission) shoulders," he added.

He said he advocated giving a company such rates as will produce a fair rate of return and will enable the owner to provide a highly technically trained force with adequate facilities to serve the telephone public.

Takes Over Carolina T&T Advertising, Publicity Post

Harold N. Simpson of Ahoskie, N. C., has joined the Carolina Telephone & Telegraph Co., at Tarboro, N. C., as advertising and publicity supervisor.

He had been with the *Ahoskie Herald* for the past four years and succeeds John Reed, who resigned to join the *Ledger-Dispatch* and *Virginian Pilot* in Norfolk, Va.

May the joys of Christmas be yours and the coming New Year be filled with prosperity and happiness

Our sincere thanks for your wonderful patronage in the past.....our desire is to serve you even more efficiently in 1958. *Whatever your needs..* we cordially invite you to call on *BUTELCO!*

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construction and maintenance DIGEST

- **Weather-scoffer**
- **On the inside**
- **Profitable noise**
- **Insure your power**

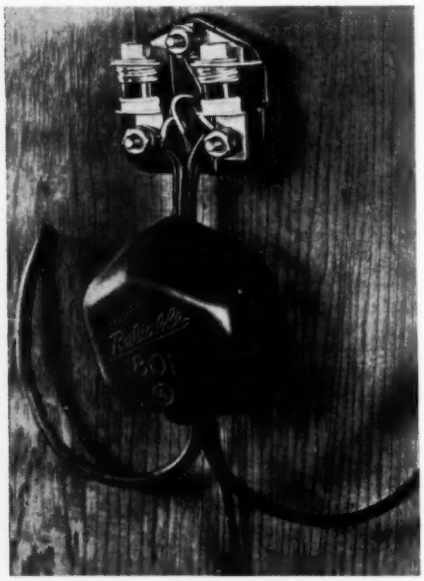
Published regularly to help you get the most out of your materials and supplies dollar

by Earl A. Roesch, Office Mgr. and Inside Sales—Rochester

Fishing is a great hobby—but it's poor business. I've noticed this over and over in my 29 years with Stromberg-Carlson. When it comes to selecting supplies and equipment, **smart** men in the telephone industry **don't** fish around. They order direct from Stromberg-Carlson and get the protection of a double guarantee—ours and the maker's. I've seen examples by the thousands of the careful attention paid to your supply needs. It's typical of the company that operates a full-time research program to bring **you** new and better telephone equipment. Your orders help us carry this program forward, faster. That's why we appreciate your business—and why we'll continue to show our thanks by giving you the best service we can.

Long life under all conditions

You get long service life under all kinds of weather conditions with the Series 800 Fuseless Protector, recently developed by Reliable Electric Company.



Easy to install and maintain

This new protector is available with Reliable No. 504 Protector Units (as No. 801) for station protection and with Reliable No. 506 Protector Units (as No. 801A) for cable protection.

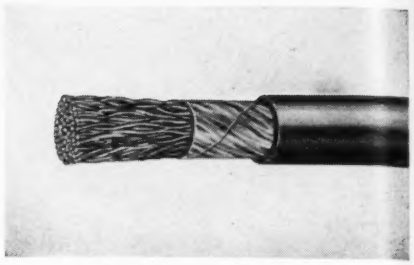
The weather-tight neoprene cover has passed the Underwriters Laboratories severe requirements for performance and weathering under temperature extremes. The protector is listed under UL Re-examination Service.

The neoprene cover fits snugly and drops out of the way conveniently when protector is installed or serviced.

Long life . . . low cost

To meet your needs for inside wiring cable, Whitney Blake Company offers Inside "Telecable"—multiconductor paired—with semi-rigid insulation—brown or ivory Plastite jacket. Available in 24 A.W.G. soft bare copper conductors up to 76 pairs and 22 A.W.G. up to 51 pairs.

This inside wiring cable gives long service life because: it is water-resistant; has high resistance to crushing; is unaffected by humidity. The semi-rigid Plastite insulation has far greater compression strength than regular polyvinyl chloride compounds. The resulting long life of the cable means much lower maintenance costs.



Semi-rigid Plastite insulation

Inside "Telecable" is light in weight and easy to install. To terminate conductors, simply strip insulation and then solder.

The insulation is permanently colored for lasting polarity identification.

For economy *plus* protection, order from your Stromberg-Carlson representative.

Noise can be money!

Take a business subscriber who has a telephone in some extremely noisy location—and who has finally decided to do something about it. Would you rather have him spend money in building a soundproofed booth—or give **you** the money as monthly income on a telephone which completely licks the noise problem?

The GAI-PHONE is such an instrument. It has a special transmitter that actually creates a "Zone of Quiet" around the handset—even in a spot as noisy as a boiler factory! It costs the subscriber **less** than a booth—and you get the revenue!

Your Stromberg-Carlson representative can offer prompt delivery on your order. Ask us for complete details.

Insure your power supply

Because Planté batteries practically last forever...providing standby power that never fails... they're the best operating insurance you

A sure, dependable supply of power when you need it. That, briefly, is the story of this Gould Planté battery.

can buy. In switchgear, signal and alarm systems, or emergency light and power applications, these lead batteries have rolled up amazing performance records . . . are famous for their ability to deliver a powerful surge or a steady flow of current the instant it's needed. Make sure you're in operation . . . always Choose Gould Planté.

Did you know . . . that Stromberg-Carlson warehouses and handles thousands of items in the field of construction and maintenance supplies alone? You can do *all* your business "under one roof" and find the same quality and reliability in every item.

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Courts and Commissions

N. Y. Commission OKs Rates, Hears Financing Pleas

The New York Public Service Commission has accepted a tariff amendment filed by Seneca-Gorham Telephone Corp., Holcomb, designed to increase rates to subscribers of its exchange at Stanley, it was reported on Dec. 5. The new rates are expected to produce about $4,900 additional annual revenue.

The company serves about 1,100 stations from the Stanley exchange through which toll-free service is also provided to Rushville and to subscribers of the Geneva exchange of New York Telephone Co.

In filing its new tariff for the Stanley exchange, the company said additional revenues were needed to enable it to continue adequate service. Because of increased operating expenses, it is estimated that even with the higher rates, the company's net annual income for 1958 will increase by only about $1,000.

•

Also, on Dec. 9, the New York commission was to have heard the petition of Midstate Telephone Co., Inc., for authority to issue $200,000 worth of 5¼ per cent first mortgage bonds; 1,250 shares of 5 per cent $100 par preferred stock, and 2,000 shares of no par common stock.

Application of Citizens Telephone Co. of Hammond, N. Y., Inc. to issue $24,000 of preferred stock was to have been heard on Dec. 13.

OK Paystation, Color Rates And Incorporation in Neb.

The Public Telephone Co., Blair, was authorized by the Nebraska Railway Commission on Nov. 22 to charge 10 cents for local calls from paystations.

A monthly rate of 25 cents was established for color telephones, jacks, extra directory listings and per-100-feet of off-premise extension mileage.

Also authorized was a rural business rate of $1.00 per month more than the rural residence rate and a joint user service rate of one-half the rate for main station service.

•

Also, the Nebraska commission on Nov. 20 authorized the incorporation of the Wilcox Telephone Co. owned by Bertha A. Potter, to be known as the Wilcox Telephone Co., Inc. Miss Potter received 800 shares of the capital stock valued at $25 per share in exchange for her real and personal property holdings in the exchange.

The incorporation was made to satisfy the requirements of a lending agency from which funds will be borrowed to improve service facilities.

Ask Review of Security Risk Discharge in Wis.

The Milwaukee, Wis. circuit court on Nov. 29 was asked to review a Wisconsin Employment Relations Board (WERB) decision upholding, in effect, the dismissal of a Wisconsin Telephone Co. employe who had been denied security clearance by the U. S. Defense Department (TELEPHONY, Jan. 12, p. 28, Mar. 23, p. 50).

The petitioner was John A. Dressler, who claimed that his discharge Feb. 22, 1956, violated the union contract and that the company was guilty of an unfair labor practice when it refused arbitration.

The government said Dressler was a member of the Socialist Workers' party. Dressler denied the charge.

Dressler's attorney, M. Michael Essin, charged that the WERB had denied Dressler a hearing and based its decision on the record of another employe discharged earlier by Wisconsin Telephone Co.

V. A. Swanson, attorney for the company, said that Dressler had no right to seek arbitration as an individual. He said that local 5501 of the Communications Workers of America had sought arbitration on the issue. An arbitrator had upheld the company's action. Swanson said that Dressler was not entitled to judicial review of the WERB decision.

Circuit Judge Leo B. Hanley ordered the attorneys to file briefs and took the case under advisement.

Emergency Increase Denied Southern Bell in Louisiana

Southern Bell Telephone & Telegraph Co. has been refused a requested 7-million-dollar-a-year emergency rate increase by the Louisiana Public Service Commission, it was reported on Dec. 5 (TELEPHONY, Aug. 31, p. 38).

The commission ruled it would consider only the company's over-all ap-

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. . . electricians

When it comes to leather goods for linemen or electricians, the name Klein today stands for the highest in quality as it has since the first wires were strung.

In Klein-Kord, too, Klein offers to industry the first specially woven fabric for safety straps—a fabric designed to permit the use of a tongue-type buckle without the risk of slitting or ripping under severe strain.

Now in Nylon Klein-Kord safety straps Klein still leads with the newest in safety equipment specially designed for use by utilities wherever power or communication lines are strung.

Write for Free Tool Guide

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plication for a permanent increase, estimated to total around 14 million dollars a year.

Commission Chairman Nat Knight said the emergency might be granted later, however, if evidence to justify it turns up during the hearing on the permanent increase request.

The company claimed that under rates reduced late in 1956 by the commission, its earnings for the first half of 1957 were only 4.27 per cent, which Southern Bell said was less than the rate it has to pay to borrow money for expansion.

Ill. Commission Decides One Rate Case; Two Apply

Tamaroa Telephone Co. has been authorized by the Illinois Commerce Commission to effect increases in rates, it was reported on Dec. 1 (TELEPHONY, Sept. 7, p. 38). R. E. Marlow, company president, said continued high costs of operation and maintenance forced the increase.

•

The commission on Nov. 27 received applications for rate raises from Hardin Telephone Co., Rosiclare, and Marion Telephone Corp., Sandoval.

The Hardin company is asking $4,500 a year more and serves 750 subscribers.

The Marion company, asking $7,000 more annually, serves 400 subscribers in Boulder, Fairman and Sandoval.

Southwestern Bell Granted $212,600 Raise in Kansas

Rate revisions designed to increase Southwestern Bell Telephone Co.'s Kansas revenue $212,600 annually were approved on Dec. 6 by the Kansas Corporation commission (TELEPHONY, Sept. 14, p. 43).

Approximately $114,900 of the increase will come from reclassification of 13 automatic exchanges which have outgrown their current rate groups. Those exchanges are Lawrence, Garden City, Hays, Hugoton, Hutchinson, La Crosse, Lecompton, Leavenworth, Lincoln, Oakley, Smith Center, Stockton and Salina.

Rates will be lowered in two exchanges being reclassified downward, Cheney and Hanover.

The cost of local paystation service in cities with a population of 2,500 or less will be increased from five to 10 cents a call. This is expected to produce an additional $10,000 a year. This move will standardize local paystation charges, since the 10-cent rate has been in effect since 1952 in larger cities.

An estimated $51,000 a year will come from revision in charges for toll calls now costing 10 or 15 cents in instances where the caller talks more than three minutes.

The remaining $36,700 of the increase will come from higher rates charged joint users of telephones.

The commission said the revisions will net the company approximately $99,000 a year after taxes.

In seeking the revisions, the telephone company said its labor costs in Kansas have gone up 5 million dollars since the last rate revision and that the company's Kansas construction program will hit a record 31½ million dollars this year.

Marion Beatty, commission chairman, said the increase will bring Southwestern Bell's return in Kansas to 5.78 per cent on its investment less depreciation. He said the company has been earning 5.68 per cent.

"These figures are based on the original cost basis," Mr. Beatty said.

Northwestern Bell Raises Rates in Iowa

Northwestern Bell Telephone Co. on Nov. 21 increased rates in 136 out of 150 of its Iowa exchanges.

A company official explained the rate increases were made necessary by increased labor, maintenance and material costs. He said this is the first increase in local rates since 1951.

Wage costs, which make up about two-thirds of the cost of providing service, have increased more than 30 per cent in the last six years, he said.

Pacific T&T Seeks Added Rate Raise in California

Pacific Telephone & Telegraph Co. on Nov. 30 applied to the California Public Utilities Commission for an annual 12-million-dollar rate increase that supplements an earlier request for 28½ million dollars now in the process of hearing (TELEPHONY, Aug. 24, p. 48).

The company stated the new increases are sought to offset higher operating costs.

Approve Alabama Purchase

The Alabama Public Service Commission has authorized sale of the Cedar Bluff Telephone Co., owned by Bert Cobia, to the Peoples Telephone Co., it was reported on Nov. 17.

Authorize Missouri Sale

The Missouri Public Service Commission told Mrs. Gladys Brown on Dec. 6 she could sell the Lanagan Telephone Co. to Mr. and Mrs. Albert L. Butts (TELEPHONY, Nov. 9, p. 41).

TROUBLE CLEARING

Concluded from page 31

for days or weeks. Both make a bad record but the record should tell the truth. We favor carrying the case until we are sure that it is clear.

When is a case of trouble OK? In our opinion, not until it has been OK'D with the subscriber and he understands that the company has closed the case and that any trouble which he may experience after that time should be reported as a new case.

Even in a case of cable failure, a voltmeter test is not sufficient to close the case. And, in a case of repeated, chronic, or disappearing trouble let the company take the subscriber into its confidence, and above all *tell the subscriber the truth.*

D. C. Power Named Head of Polio Division Fund Drive

Donald C. Power, president of the General Telephone Corp., has been appointed chairman of the communications division of the 1958 National Foundation for Infantile Paralysis Campaign, according to an announcement by Roy W. Moore, chairman of the board of Canada Dry Ginger Ale, Inc. and general chairman of the 1958 New York March of Dimes drive.

In accepting the divisional chairmanship, Mr. Power called upon the entire communications industry to join in an all-out effort to aid the March of Dimes.

"It would be ironic if after discovering a vaccine which can prevent poliomyelitis, we forget the thousands of Americans already stricken with the disease," Mr. Power said.

"Unless these victims can be restored to the optimum degree of health and usefulness in society," Mr. Power noted, "we cannot pride ourselves as having conquered this dread, crippling disease."

The National Foundation for Infantile Paralysis will seek 44 million dollars in the 1958 drive primarily to help rehabilitate tens of thousands of polio victims left in the wake of the vaccine's conquest of the polio virus.

Inescapable Effect

"The humblest individual exerts some influence, whether for good or evil, upon others."—BEECHER.

The Force of Analysis

"Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life."—MARCUS AURELIUS.

Announcing the New

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model YMR-76 service body

Designed and Built to perform Service Jobs Faster, Safer, more Economically for You!

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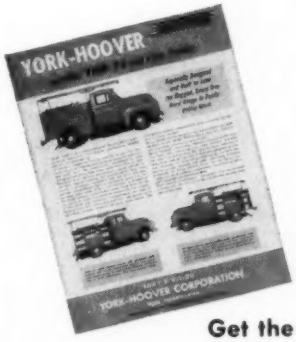
- The Model YMR-76 is designed to provide more space for the convenient carrying of materials and tools. A thru material drawer in rear compartment and a thru compartment at front is particularly useful in addition to other specialized cabinet arrangements.
- "Custom" construction features include four sturdy cross members beneath the steel treadplate floor for greater base stability . . . a deep drop gate at the rear, especially designed to prevent sagging . . . easy-action telescoping roof . . . and double panel compartment doors incorporating galvannealed non-corrosive steel.
- Invest in the model YMR-76 service body. It's new—modern—proven—efficient. It will provide trouble free service over a long period of years for you!



Get the complete story on the York-Hoover YMR-76 Service Body. Write for Bulletin No. 942 Today!

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TELEPHONY'S TRAFFIC ENGINEERING HANDBOOK

Continued from page 25

Level "9"

Refer to level 9 computations and add these 23.8 CCS to the total CCS for the partial group of 37 first selectors.

135 CCS + 23.8 CCS = 158.8 CCS.

Referring, again, to the "Selector Multiple Table," column 120 sub-group, we find the closest figure to 158.8 CCS is 174 CCS which calls for 11 trunks, one more than was originally engineered for the group.

Therefore, should there be incoming selectors, the final computation for the 9 level would be:

120	First selectors multiplied on 25 trunks
37 + 8	First selectors multiplied on 11 trunks
165	First selectors multiplied on 36 trunks

Use this same method for levels 1 and 2, adding the CCS load delivered by the incoming selectors to the load which the regular first selectors develop.

(Part 6 will be continued next week)

Wisconsin Commission Sets Two Rate Hearings

The Wisconsin Public Service Commission recently set the following hearings:

Dec. 9: Coon Valley Farmers Telephone Co. application to increase rates.

Dec. 12: Request of Oconto Rural Telephone Co. for permission to raise rates.

N. H. Company Requests Authority to Buy

The Chester Telephone Co. has asked the New Hampshire Public Utilities Commission to permit the purchase of the Weare Telephone Co. and thus to pave the way for the conversion of the Weare area to dial service. Loren Rand of Chester is the majority stockholder in both companies.

The Chester company has obtained a $200,000 loan from the Rural Electrification Administration to convert to automatic operation and plans to use the same method in financing it at Weare, it is reported.

Chester is scheduled to begin dial service in June 1958. If the commission approves the petition, which has now been taken under advisement by that board, the same rates will be charged in both communities when dial service is furnished. Residence automatic rates will be $6.25 for one-party; $5.25 for two-party, and $4.50 for a four-party or rural line.

Present Chester residence rates are $4.25 for one-party and $3.25 for four-party or rural line. There are no two-party lines on the Chester system.

Present Weare residence rates are $5.50 for one-party service, $4.50 for two-party, and $3.75 for four-party or rural service.

C&P of Md. Asks Higher Rates to Cover Wage Raise

The Chesapeake & Potomac Telephone Co. of Maryland on Dec. 3 increased its request for additional annual revenue by $1,400,000 (TELEPHONY, Aug. 31, p. 38).

As hearings resumed on the C&P application for higher rates before the Maryland Public Service Commission, the company said that it needs the additional amount because of wage increases granted to its employes this fall.

The new request brings the total amount sought to $8,255,000. The company filed a petition last Aug. 16 asking for telephone rates designed to produce $6,855,000 in extra revenues.

Giving effect to the wage increases, the proposed rates and a tax adjustment, William F. Johnson, company vice president, estimated the company's rate of return on Dec. 31, 1957, at 6.58 per cent and on June 30, 1958 at 6.44 per cent.

Service Begun to St. Helena

The Long Lines Department of American Telephone & Telegraph Co. announced that telephone service between the United States and the island of St. Helena, off the west coast of South Africa, became available on Dec. 2.

Equally Handicapped

"To all intents and purposes, he who will not open his eyes is, for the present, as blind as he who cannot."—SOUTH.

The FIRST Book of Its Kind..

...introducing the reader to the world of telephone communications

Written by a leading educator in an easy to read style, and beautifully illustrated with authentic photographs.

Some chapters included are:

- *Planning and Engineering*
- *School to Home Service*
- *Direct Dialing Service*
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- *The Nike*
- *Radio and TV Monitoring Service*
- *Mobile Telephone Service*

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DATA TRANSMISSION

Concluded from page 22

useful tables and formulae for telephone transmission studies.

Next, one must know the difference in frequency between two adjacent humps on the curve. Then the following calculation will show the distance to the impedance irregularity:

$$\text{Distance} = \frac{\text{Velocity}}{2(f_2 \text{ minus } f_1)}$$

Velocity may be given in tables as miles per second or load sections per second. The two items marked "f" are adjacent frequencies taken from the curve for the pair in question.

Conclusion

This series of articles is intended as a guide to this new business of data transmission. Much more will be said and written on the subject, and new methods and new devices may be expected to appear rapidly in this fast growing branch of the business.

A great deal has already been written on the subject of computers, but there is no surplus of material to tell the telephone man where he fits into the picture. Some of the reference sources used in these articles are the following:

Digital Data Transmission—The Lenkurt Demodulator, September 1957.

Transmission of Digital Information Over Telephone Circuits—Bell System Monograph 2426.

An Envelope Delay Measuring Instrument (Cannon) Communications and Electronics (AIEE) January 1956.

A Data Transmission Machine (Doty & Tate) Communications and Electronics (AIEE) November 1956.

Operation of Electronic Brain Computers With Telegraph Circuits (J. H. Toop) Western Union Review, October 1956.

Communication Engineering (Everett & Anner)—Chapter 9—Reflections.

The Application of Electricity and Magnetism to Transmission in the Telephone Plant (AT&T) Section III.

Principles of Electricity applied to Telephone & Telegraph Work (AT&T) Chapter 35; A. C. Measurements.

High Speed Data Transmission (Malthaner) *Bell Laboratories Record*, April 1957.

The Place of Communications in Integrated Data Processing (Mann) IRE 1956 Convention Record.

An Envelope Delay Scanner (Hunt & Albersheim) Bell System Monograph 1967.

Measurement of Phase Distortion (Nyquist & Brand) Bell System Monograph B-483.

Improvements in Toll Connecting Circuits (Wagner & Felder) Bell Laboratories Record, August 1957.

E-Repeater Test Set (Smethurst) Bell Laboratories Record, January 1956.

Small Business Can Afford Electronic Processing (Brayer), American Business, June 1956.

Audio-Frequency Impedance Measurements, Aerovox Research Worker, March 1957.

IBM 65-66 Data Transceiver—Manual of Operation.

(The End)

Ship-to-Shore Station Opened in Netherlands

A very high frequency radio-telephone station has been opened at Maassluis, the Netherlands, on the New Waterway from the North Sea to Rotterdam, it was announced on Nov. 25.

The station, said to be the first of its kind in Europe, will be used exclusively for ship-to-shore traffic for vessels on the New Waterway, on the Maas River, and in Rotterdam harbor basins.

Reports may be exchanged on the movement and safety of vessels and in

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- Film projection transparencies for training departments can be made as easily as a paper copy and at a very low cost. A new, simple coloring method now available.
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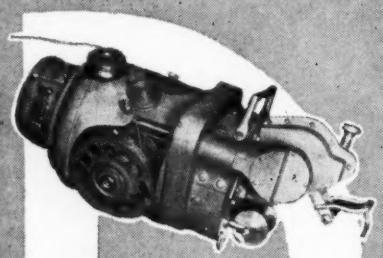

*The Neale Model "D" pull type spinner for over 12 years has been the work horse of the cable spinning field

- Spins new and existing cable
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- Uses all sizes and types spinning wire
- Weighs only 42 pounds

THE MODEL "D" IS THE WORK HORSE IN THE CABLE SPINNING FIELD

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an emergency, on the safety of persons. Exchange of other messages should take place via the Government Coastal Station "Scheveningen Radio," according to the U. S. Consulate General, Rotterdam.

BDSA Names Falk Director, Communications Division

The appointment of Alexander J. Falk as director of the Communications Industries Division of the Business & Defense Services Administration (BDSA), U. S. Department of Commerce, was announced on Nov. 25 by BDSA Administrator H. B. McCoy.

A. J. FALK

The appointee has served as acting director of the communications division since September 1957. The division was formerly headed by a WOC (without compensation) employe from private industry.

The current and future designations of career officials as industry division directors do not in any way conflict with the WOC program as announced by Secretary Weeks on June 28. BDSA will continue to appoint executives on loan from industry to serve as assistants to the industry division directors.

Mr. Falk, who first entered government service in 1942, was principal communications specialist of the telephone section of the War Production Board communications division in World War II. He resigned from the government in 1945 to enter the communications field with the Dictograph Corp., and then returned in 1948 to become a management engineer for the Department of the Army.

He joined the Communications Equipment Division of the National Production Authority in February 1951 as first technician on the division staff. He has served as deputy director of the Communications Division, BDSA, under all WOC directors since January 1954.

During his tenure as deputy director and acting director of the division, he has worked closely with both the operating communications and manufacturing communications industries in the development of mobilization and business service programs. Plans have been made to extend the activities of the division to provide broader assistance to industry.

Mr. Falk was employed as a central office equipment engineer by the Western Electric Co. for a number of years before entering government service, BDSA reports he is a recognized industrial specialist. Mr. Falk was born in Chicago, Ill.

General of SE Appoints Pulliam Equipment Engineer

Hugh Pulliam, former manager of the South Carolina division of the General Telephone Co. of the Southeast, has been named general equipment engineer for the company's six-state operation, with headquarters at Durham, N. C.

A native of Illinois, Mr. Pulliam entered telephone work in 1936 at Clinton, Ill., served in the Navy as chief radioman during World War II, and returned to telephone work as a plant engineer in 1945.

In 1948 he was transferred to Wisconsin as plant superintendent of an Independent company, with headquarters at Black River Falls, and in 1950 became plant superintendent for the Kentucky-Tennessee exchanges of the Southern Continental Telephone Co., which are part of the General Telephone System. He had been manager of the South Carolina division since 1953.

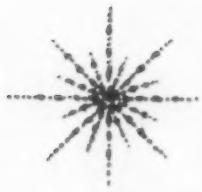
Iowa Cooperative Names General Manager

Emmett Wiley, formerly employed by the Grand River Mutual Telephone Corp., Princeton, Mo., as commercial and traffic superintendent of the company's Iowa exchanges, resigned that position recently to accept the position of general manager of the Rockwell (Ia.) Cooperative Telephone Association.

J. B. McGaheran, formerly acting manager, resigned that position to devote more time to his banking operation.

The Rockwell company, operating exchanges in Rockwell and Dougherty, recently received approval of a loan from the REA to rebuild the entire system and convert to automatic operation.

Christmas 1957



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NEW! EXTRA LONG RECEIVER Koiled Kords* NOW IN COLOR

Extra long receiver KOILED KORDS in color enable you to offer another service to those subscribers who want to move more than four and a half feet from their instruments.

New, long KOILED KORDS retractile cords in color — and in black — are offered in two standard lengths, 18 inches retracted that extend to approximately 9 feet and 30 inches retracted that extend to 15 feet.

Extra long receiver KOILED KORDS are available in colors to match all telephones. See your telephone supply house for full information.

Koiled Kords

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KOILED KORDS, the original retractile cords, are the result of 17 years of research, development and use.

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"Super-Splice"®

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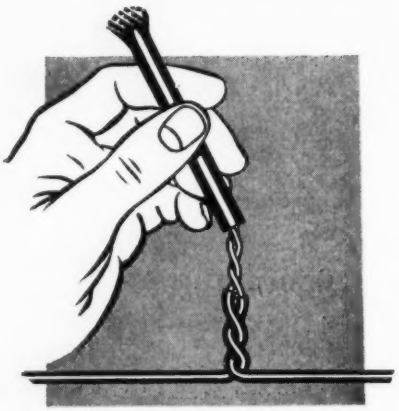

"Super-Splice" makes splices waterproof . . . from inside out!

Sealed at one end, this plastic splice sleeve is filled with an insulating and waterproofing compound.*

Economical "Super-Splice," a Superior exclusive, makes the splice permanently as good as the cable . . . yet it can be re-entered easily. The compound never hardens or oozes out no matter what the temperature.

Prevent leakage currents and breakdowns in the presence of moisture...good for 25,000 v.d.c. Order "Super-Splice" NOW!

*A Dow-Corning silicone compound.

An REA Standard.

"Super-Splice" is available for use with straight, butt or bridge splices.

For further information on economical "SUPER-SPLICE", write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION
Hickory, North Carolina

Helpful Literature

WIRE—Whitney Blake Co. has recently released a 22 page loose leaf catalog printed in three colors. This catalog provides a complete listing of all Whitney Blake telephone wire products including several new items that have been added to the line in the past two years. Request HL380.

•

ELECTRONICS—Skilled technicians are still in great demand in the growing field of electronics, according to an industry-wide survey just completed by the Cleveland Institute of Radio Electronics.

The survey indicated that the tremendous rate of growth in the electronics industry during the past 10 years will be maintained, thus providing more job opportunities than ever before. Employers will hire new technicians for mobile radio installation, radio and television broadcasting, military, airline and industrial electronics as well as for other rapidly-expanding fields.

An informative 24-page booklet, titled "Opportunities in Electronics for You," has been designed to provide pictorial coverage of opportunities in electronics, plus thumbnail descriptions of many of the available employment opportunities. Its purpose is to stimulate interest in electronics as a career for qualified men. Request HL381.

•

NEW FACILITIES—General Machine Products Co., Inc., has issued an eight-page booklet describing its new 60,000 square foot plant and outlining its manufacturing facilities.

The firm, formerly located in Philadelphia, is now in full operation at the new plant in Trevose (Pa.) just north of Philadelphia.

Since 1918, General Machine has been a leading supplier of special machinery, tools, and equipment for the electrical, electronic and communications industries. In addition to these specialized fields, the firm makes a wide variety of precision components, special machinery, controls and sub-assemblies for aircraft, mining and a diversified group of industries. Request HL382.

•

CABLE SPLICER BODIES—J. H. Holan Corp. is offering a four-page, two-color brochure for those interested in cable splicer bodies. The new brochure has photos, uses, design features and specifications for five bodies ranging from a one-man combination unit to a two-man maintenance unit with a mechanically-operated hydraulic ladder. Request HL383.

•

TRANSPOSITION BRACKETS—A new brochure, now available from from Transandean Associates, Inc., gives complete information on its line of Case aluminum transposition brackets for carrier-circuit construction, plus their specially designed glass and rubber insulators.

In addition, the new brochure gives full instructions and diagrams on the

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Please have the manufacturer send me without obligation further information on the products described in the following numbers:

HL380_____; HL381_____; HL382_____; HL383_____;
HL384_____; HL385_____; HL386_____; HL387_____;
HL388_____; HL389_____; HL390_____; HL391_____;
HL392_____.

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Company.....

Street.....

Town and State.....

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recommended method of installing the Case span brackets, assembly and installation of the Case crossarm-type bracket, and a typical installation (straight line construction). Request HL384.

•

BOOTH COLOR CARDS—Suttle Equipment Co. recently prepared a new color card, showing five of the standard finishes available on its complete line of indoor and outdoor telephone booths.

The cards show chips for the following attractive decorator colors: Wheat, sage green, walnut, platinum and mahogany. Not shown are color chips for light and dark oak. These colors are developed by American-Marietta Co. Request HL385.

•

PLASTICS PROPERTIES CHART—Comparative properties of General Electric's new Lexan® poylcarbonate resin and other thermoplastic molding materials are outlined in a Plastics Properties Chart recently issued by the company's Chemical Development Department.

The new polycarbonate plastic shows outstanding impact strength (12-16 feet lb/in on the Notched Izod test), and a heat distortion point of 280-290° F at 264 psi.

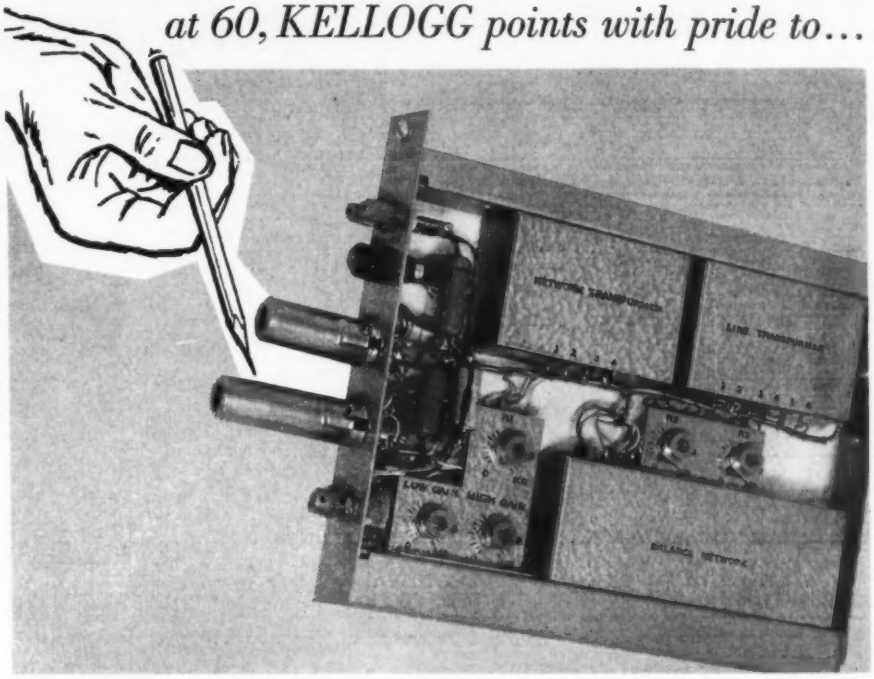
Other test data listed includes electrical and physical properties, as well as molding characteristics. Request HL386.

•

ELECTRIC POWER PLANTS—Katolight Corp. now has a brochure available designed to familiarize persons principally with the merits of emergency electric power plants.

The brochure also indicates standard models available and any additional controls and panel equipment that may be desired; also helpful hints in selecting a standby unit for a home, farm, amusement, government, and commer-

at 60, KELLOGG points with pride to...



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KELLOGG "TYPE Z" VF REPEATER . . . Low operating cost. Low first cost. Reduces transmission losses up to 85%. "Built-in" equalization. Flat circuit response over entire voice band. Variable controls make rapid setup practical. Optimum performance easily obtained. Operates from 48V exchange battery. Sealed components. Plug-in construction. Compactness. Universal application.

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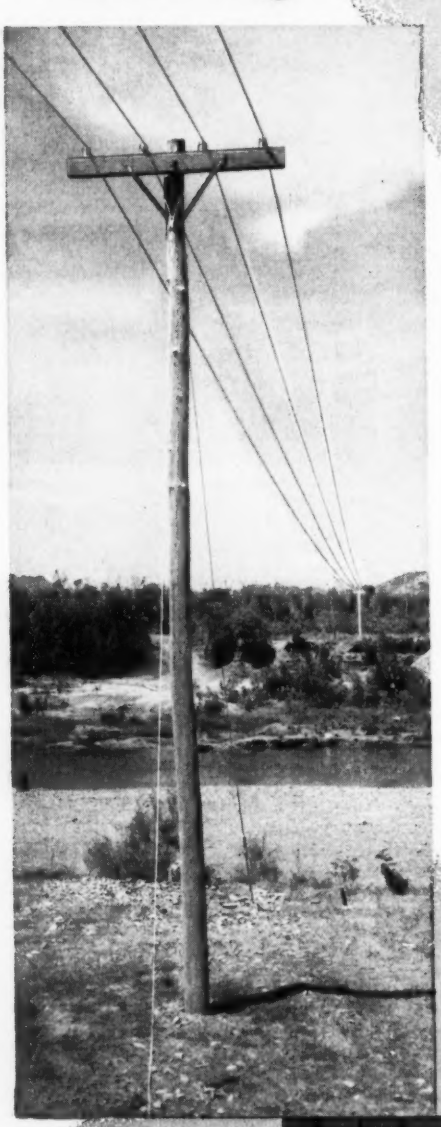
FOR EXTRA LONG SPAN RURAL LINES

The *NEW* *LOWER* Resistance Extra-High Tensile Line Wire



- **Better Voice Transmission**
- **Spans to 600 Feet or More**
- **Savings in Material and Labor**
- **Lower Ultimate Costs**

Superior voice transmission qualities and extra high physical strength are combined in **Crapo** HTL-195 to provide the most practical and economical of conductors for rural telephone circuits.

This new, lower-resistance steel line wire, with a minimum breaking strength of 1800 pounds, makes possible spans to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading areas. Where terrain and other conditions permit the use of extra long spans, this means a 40% reduction in pole structures. The savings in materials and in construction costs will be apparent.

Before building new, or replacing old rural lines, investigate the possibilities of **Crapo** HTL-195! Write for complete information, including Manual of Engineering Data, No. A-195!

Pioneers in the development of high tensile and extra-high tensile steel line wire, and associated products, for the telephone industry.

INDIANA STEEL & WIRE COMPANY, INC.
MUNCIE, INDIANA

cial use and particularly the hospital and institutional fields where a power shortage could create discomforts or even disastrous situations.

The brochure also mentions other Katolight electrical generating equipment to 500 KVA. Request HL387.

•

PLASTICS MOVIE—George Eastman, the inventor of modern photography, emerges as a pioneer figure in the history of plastics in a new 16 mm. movie, in sound and color, now available for general release.

"Portrait in Plastics," the 24-minute movie produced by the plastics division of Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co., shows that Mr. Eastman began investigation of plastics as far back as 1889. Starting in Waterville, N. Y., in the very house in which he was born, the movie explains how Mr. Eastman's genius for photographic technology led, over the years, to the development of a plastic film base.

Continued research by Eastman resulted in the development of rapid and economical techniques for molding plastics, and to the introduction of Tenite acetate, the first Eastman plastic, in 1932. In the 25 years since then, as the film shows, the growing family of Tenite plastics has played an important role in expanding end uses for plastics from novelties to a wide variety of consumer and industrial products.

Color, in particular, has been one of the areas by which Eastman has encouraged use of plastics. During the movie—which is one of a series of projects to commemorate the first quarter century of Tenite plastics production—a visit is paid to the Tenite plastics laboratories at Kingsport, Tenn. Here the viewer learns how color technicians use a file of over 38,000 color samples to adapt the Tenite plastics to a multitude of functional and decorative purposes.

Other sequences show butyrate, acetate, and polyethylene production facilities of Tennessee Eastman Co. and Texas Eastman Co., manufacturing divisions of Eastman Kodak Co.

A fuller description of the movie is given in a folder that is also available. Request HL388.

•

ELECTRONIC COMPUTER—A new aid to help top management investigate the electronic computer, its capabilities, operation and applications has been published by Remington Rand Univac Division of Sperry Rand Corp., in a 196-page manual titled, "A Study for

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USE REX RURAL DISTRIBUTION WIRE

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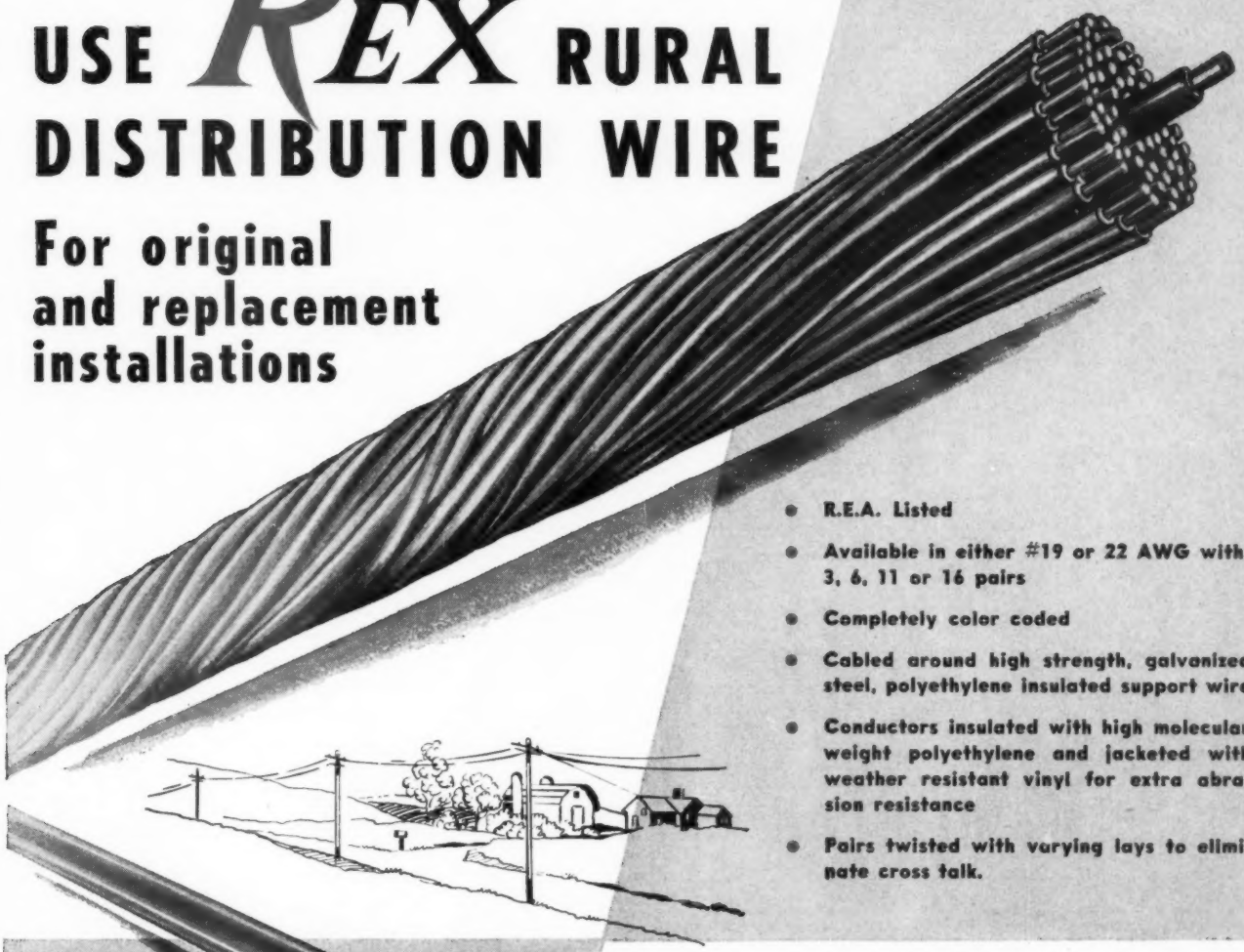

- R.E.A. Listed
- Available in either #19 or 22 AWG with 3, 6, 11 or 16 pairs
- Completely color coded
- Cabled around high strength, galvanized steel, polyethylene insulated support wire
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CUT POLE LINE COSTS WITH REX ONE PAIR

(Type C Distribution Wire)

- For span lengths up to 600 ft.
- Parallel conductors are encompassed in high molecular weight, weather resistant polyethylene
- Raised ridge tracer provides polarity identification
- Easily installed
- High electrical characteristics
- Available in #14 or #12 AWG copperweld or .083 steel

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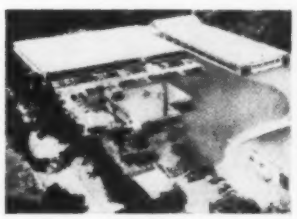

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Bashlin Quality again is outstanding in this "safety first" body belt. Comfortable, with tools in easy reach . . . Doubly Safe because Bashlin Body Belts have the additional Nylon Safety Feature.

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Management—The Univac II Data Automation System."

Written entirely from the management point of view, the illustrated manual is the idea starting point for thorough exploration of electronic data processing. The material is based on the collective experience of hundreds of Univac specialists who have trained management and operating personnel since the first Univac was installed in 1951.

The manual begins with a study of the data processing areas in a typical manufacturing firm, then a listing of current computer applications, classified by type of industry. A survey of the types of data processing systems—manual, key driven, punched card, and electronic computers rounds out the introductory section.

Considerations for electronic data processing are covered in the second section: Choosing the applications, selecting equipment, selecting and training personnel, preparing the computer program, the cut-over to an electronic system, planning the computer organization—all areas that management will want to study in detail.

The operations of the Univac system itself are explored in following sections. The "what," "why," and "how" of the components of the computer—the central computer, memory units, control units and arithmetic units—are discussed and illustrated.

Similar detail is provided for the input-output units of the system, which convert data to the magnetic tape language of Univac, and reconvert the output to printed form or to other data storage media such as punched cards or punched paper tape.

A complete introductory course of Univac programming, suitable for use as a classroom text, is presented in five sections. These include: Process charting, flow charting, and coding; processing internally stored data, processing externally stored data, and coding techniques.

Another section takes up the design of systems, explaining the types of computer runs, the meaning of process chart symbols, and the techniques of file maintenance.

Complete details of how information is represented for the computer, how it is processed in the computer, and how the Univac insures absolute accuracy are also included. Tested exercises are provided throughout the programming sections, with answers in the Appendix.

Also included are techniques for sorting data on the Univac System and common operational routines. Request HL389.

OPTICAL AIDS—The Edmund Scientific Co. has issued an 80-page illustrated catalog of over 1,000 optical items. Components and finished instruments for industry—for many Geophysical Year projects.

A wide variety of industrial quality

control tools—cost cutting, work speeding instruments for checking, measuring; including measuring magnifiers, microscopes, pocket comparators, etc. Many war surplus optical bargains. Exceptional imported instruments.

Telescopes and accessories, microscopes, satellite scopes, solar furnaces, infrared telescopes and parts, lenses, prisms, wedges of all descriptions; hand spectroscopes; reticles; mirrors; astronomical telescopes; binoculars; countless hard-to-find optical items.

Research labs, production and design engineers, scientists, inventors, experimenters, hobbyists will find this a convenient and economical source of supply. Request HL390.

•

WIRE AND CABLE MANUAL—The second edition of the Rome Cable Manual of Technical Information, a 393-page manual of the wire and cable industry first published 10 years ago, has just been issued by Rome Cable Corp.

Some extensive and completely new sections, new information and illustrations have been added to the original edition and the entire manual brought up to date, page by page. One hundred thirty pages have been added without materially affecting the size of the book.

The index has been greatly improved to simplify use. For example, under "Current Carrying Capacities" in the index there are 48 listings covering

this subject. They are conveniently broken down by voltage classifications, copper temperatures, load factors and cable types.

Revision of the manual keeps pace with technical advances and changes in wires and cables since 1947, the date of the first edition. Also reflected are changes in industry standards, regulations and practices in the last decade. Particular emphasis has been placed on the newest materials and methods in the field.

The manual is divided into eight sections: (1) Wire and cable technical tables, (2) wire and power cable engineering calculations and data, (3) communication frequency data and calculations, (4) National Electrical Code data, (5) properties of metals, (6) general technical information, (7) conversion tables and (8) cable installation practices. A 23-page alphabetical index follows.

The section on cable installation and practices is new with this edition. The detailed information covers arc-proofing, bending radii, cable installation, lightning protection, proof testing, pulling compounds, pulling tensions, splicing control cables, splicing instructions, splicing power cables, splicing telephone cables and terminating power cables.

The section entitled "Wire and Cable Technical Tables" now includes information on aluminum conductors as well as copper. Information on new sheath, insulation and conductor materials has been added. The section on the National Electrical Code has been brought up-to-date too with the latest code changes and new tables.

The section "Wire and Power Cable Engineering Calculations and Data" is a comprehensive engineering guide to cable design, selection and operation. Request HL391.

•

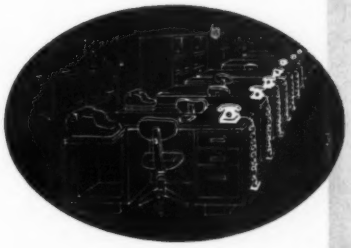
CARRIER SYSTEMS—Panhandle Electrical Sales, Inc. has issued three booklets on its telephone carrier equipment.

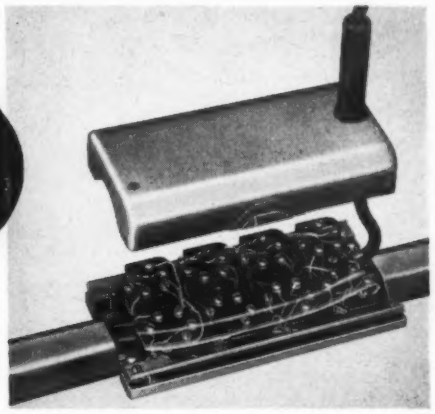
One folder describes the company's pole-mounted weatherproof equipment housings which are designed to pole-mount FM telephone carrier terminals with associated line filters when required. They are equipped with a power panel which contains a circuit breaker switch and protector mounting.

Drilling is provided in the panel for mounting a Sola CVH constant voltage transformer. All internal wiring is done and power outlets are provided at intervals adjacent to the carrier terminals. Adequate ventilation is provided.

When so ordered, Panhandle Electric Sales will mount the carrier terminals

at last! a low cost MULTIPLE TERMINAL BOX for Planned Telephone Systems





Designed to accept as many as four type 44 terminal blocks, Wiremold's new 2644T Multiple Terminal Box permits Planned Telephone Systems *without attaching fittings to office furniture.* Installation is easy—no new tricks or special equipment are needed. It can be hooked up to any overfloor system—and it's used with underfloor systems as well.

For a trip proof cable system, 2600 Pancake® is the flattest overfloor duct made. It's strong as a bridge, and easy to install with a few simple fittings.

Wiremold developed the first single terminal box for overfloor applications, and again is first with the multiple terminal box. For full information about these Wiremold developments, write:

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TELEPHONE AND TELEGRAPH EQUIPMENT

Radio Engineering Products is currently producing a number of types of equipment, electrically and mechanically interchangeable with standard Bel System apparatus.

CARRIER-TELEPHONE EQUIPMENT

C5 Carrier-Telephone Terminal (J68756). A kit for adding a fourth toll-grade channel to existing C systems is available. • C1 Carrier-Telephone Repeater (J68757) • 121A C Carrier Line Filter • H Carrier Line Filter (X66217C).

CARRIER-TELEGRAPH EQUIPMENT

40C1 Carrier-Telegraph Channel Terminal (J70047C) • 140A1 Carrier Supply (J70036A1, etc.) • 40AC1 Carrier-Telegraph Terminal.

VOICE-FREQUENCY EQUIPMENT

V1 Telephone Repeater (J68368F) • Power Supply (J68638A1) • V1 Amplifiers (J68635E2 and J68635A2) • V3 Amplifier (J68649A) • V-F Ringers (J68602, etc.) • Four Wire Terminating Set (J68625G1) • 1C Volume Limiter (J68736C).

D-C TELEGRAPH EQUIPMENT

16B1 Telegraph Repeater (J70037B) • 10E1 Telegraph Repeater (J70021A) • 128B2 Teletypewriter Subscriber Set (J70027A).

TEST EQUIPMENT

2A Toll Test Unit (X63699A) • 12B, 13A, 30A (J64030A) and 32A (J64032A) Transmission Measuring Sets • 111A2 Relay Test Panel (J66118E) • 118C2 Telegraph Transmission Measuring Set (J70069K) • 163A2 Test Unit (J70045B) • 163C1 Test Unit (J70045D).

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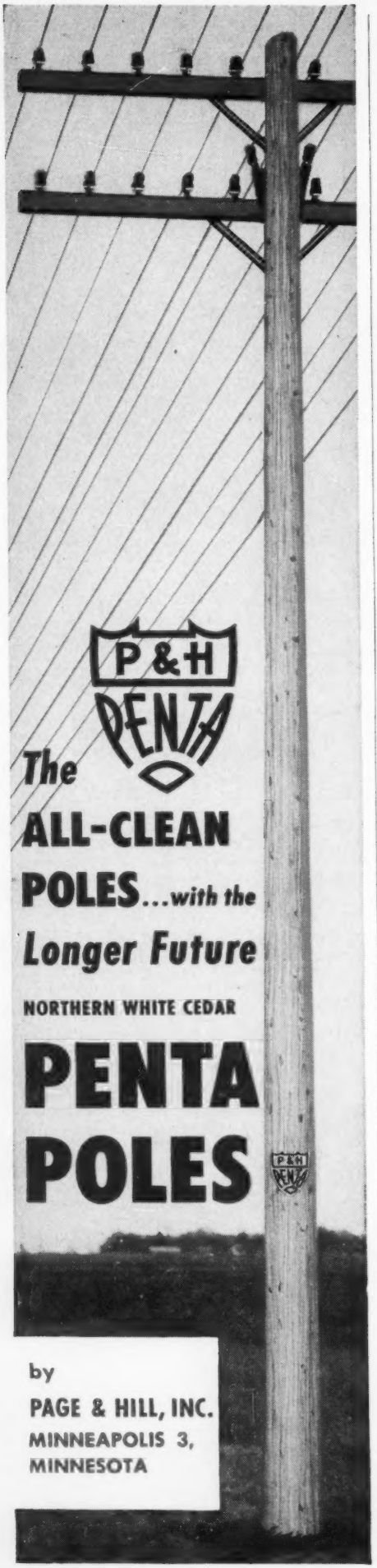


and any required filters in the housings, and completely wire them ready for connection to the carrier line and subscriber drops. There is no extra charge for this service. A wiring diagram is fastened to the inside of the door.

Orders should include a sketch and instructions for mounting. Sola constant voltage transformers, when ordered, will be mounted and wired in housings.

Panhandle Equipment Housings may be used for pole-mounting other telephone equipment designed for standard 19 inch equipment racks such as repeaters, filters, line equipment, radio equipment, etc.

Another booklet describes the Panhandle FM carrier systems for subscriber and trunk use.

The third booklet is an installation and maintenance manual of the company's FM carrier systems. Among the subjects discussed in detail are: Equipment mounting—nomenclature and physical description; installation; line-up instructions; maintenance, and circuit description and drawing list. Request HL392.

The Urgent Need

"Unless Americans choose to alter some of their basic values, there appears to be a good chance that they may lose freedom of choice with respect to life's values and everything else." —*Portland Oregonian.*

A Yardstick

"When big people get together, they discuss ideals; when average people get together, they discuss things, and when small people get together, they discuss other people."—*Hanover (Kan.) News.*

Geneology of Prejudice

"Prejudice is the child of ignorance." —HAZLITT.

Presents American Telephone To Tokyo Vice Governor

Symbolizing the part that communications play in international relations, a new green wall telephone handset, manufactured by Kellogg Switchboard & Supply Co., a division of International Telephone & Telegraph Corp., has been presented in Tokyo to Hajime Sato, vice governor of the Japanese capital.

The gift telephone was taken to Japan by Mrs. L. H. Harvig of Melrose, Minn., wife of Tom Arvig of the Melrose Telephone Co. She was one of a 21-member trade delegation from Minnesota to the Orient on a tour led by Minnesota's governor, Orville L. Freeman, and his wife. The 20-day itinerary included Formosa, Hong Kong and the Philippines.

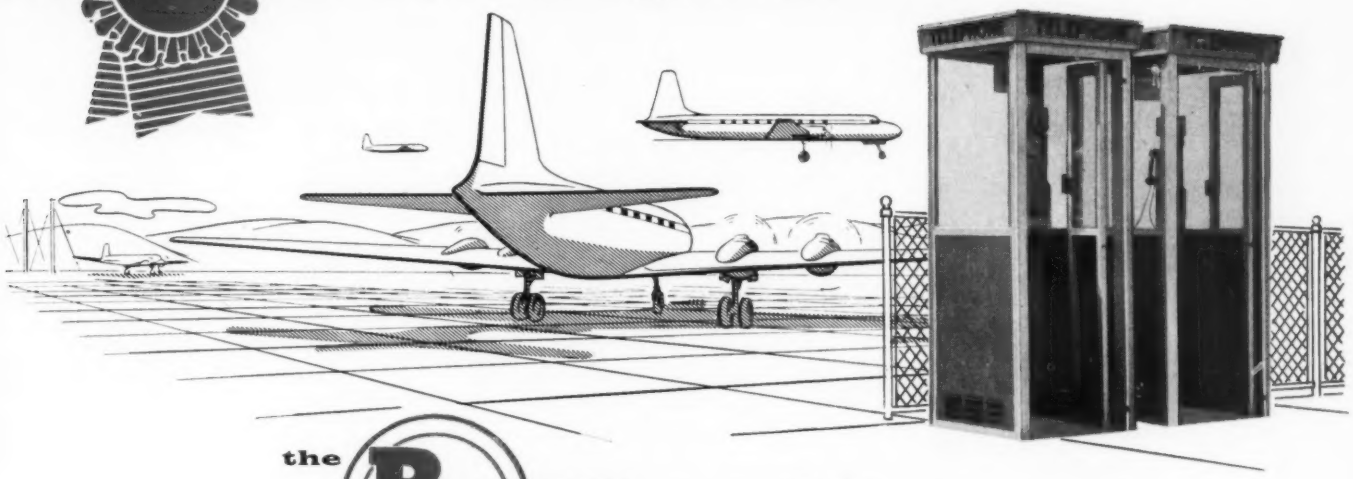
In a Nov. 2 ceremony at the Minneapolis airport, the telephone was turned over to Mrs. Arvig by Robert T. Kolbensvik of Minneapolis, Kellogg's northwestern division sales manager, for delivery to the Japanese official.

Mrs. Arvig, representing the American telephone industry on the tour, was particularly interested in Japan's Direct Distance Dialing system. While in Tokyo she was the guest of Mr. and Mrs. Howard F. Van Zandt. Mr. Van Zandt, assistant vice president and Far Eastern representative of International Standard Electric Corp., also an IT&T division, is a prominent figure in the communications industry throughout the Far East as well as the United States.

Prior to his transfer to ISE early in 1956, Mr. Van Zandt was with the Chicago sales offices of Kellogg. The sale of Kellogg crossbar and toll switchboard equipment at Takasaki, Kuragano and Annako was made under his direction.

Robert T. Kolbensvik, northwestern division sales manager, Kellogg Switchboard & Supply Co., in recent ceremony at Minneapolis airport, turns over Kellogg telephone to Mrs. L. H. Arvig of Melrose, Minn., for presentation to the vice governor of Tokyo. Mrs. Arvig was a member of a Minnesota trade delegation to the Orient.

BEST for airports



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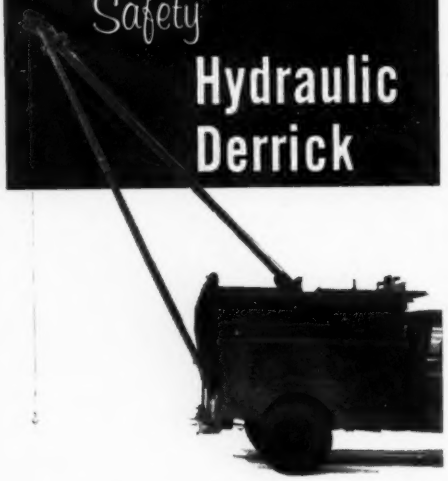

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Collins Radio Names New Sales Representative

Collins Radio Co. of Cedar Rapids, Ia., has announced the appointment of Herbert I. Pierce as representative in its central region sales department. He will serve microwave radio users in the states of Montana, Wyoming, the Dakotas, Minnesota and Wisconsin. He will have headquarters in Minneapolis.

Mr. Pierce attended Montana State University and the University of Washington, majoring in electrical engineering and was an associate field engineer for Collins prior to receiving the Minneapolis assignment.

A radio amateur for many years, Mr. Pierce was formerly owner of the General Electronics Co., Billings, Mont., specializing in survey and design of VHF and microwave systems. He also served as a zone manager for Motorola, supervising sales, and service organizations, in the Montana area for seven years.

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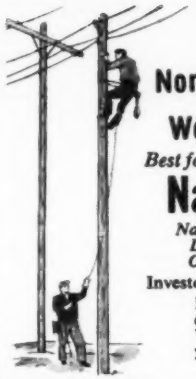

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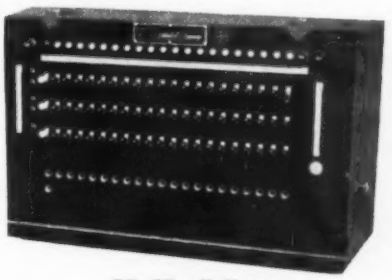

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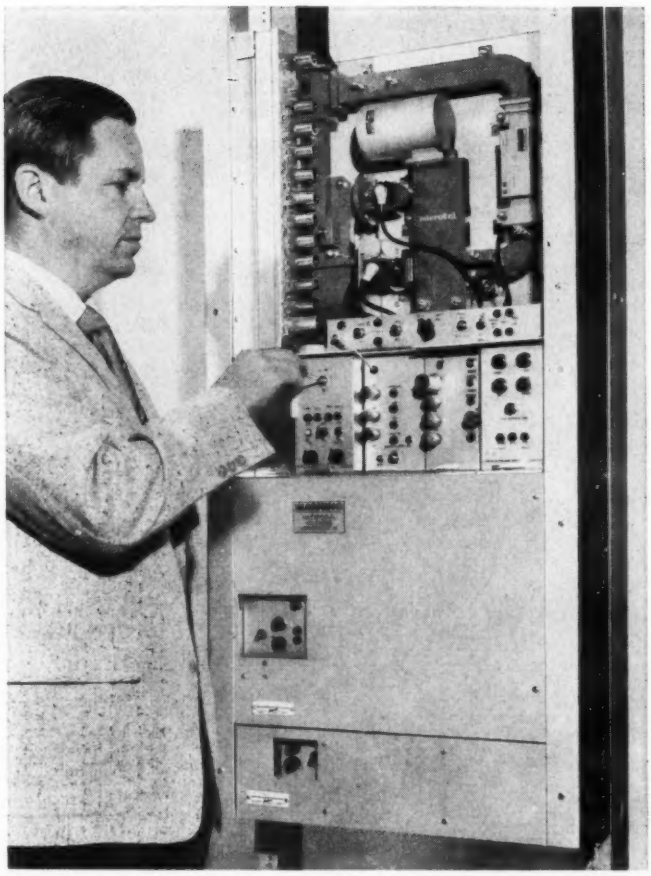

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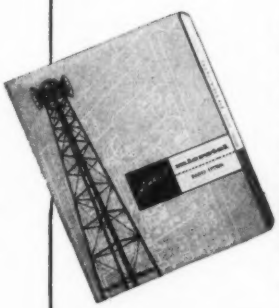

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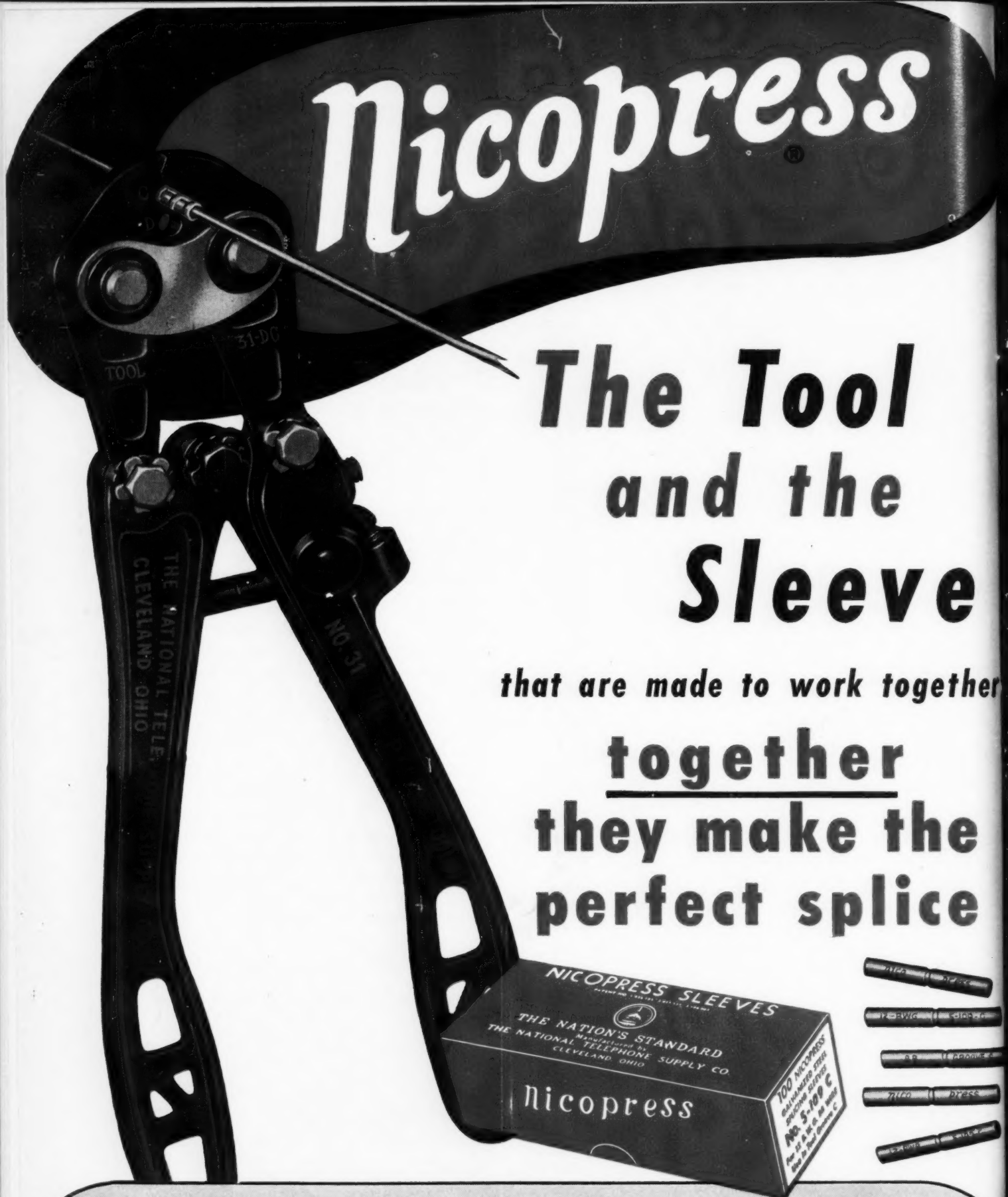

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